SITE-SPECIFIC HEALTH AND SAFETY PLAN (HASP)

FOR THE GULFCO MARINE MAINTENANCE SUPERFUND SITE

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS)

PASTOR, BEHLING & WHEELER, LLC (PBW)

PREPARED BY:			
TITLE	**NAME**	**SIGNATURE**	**DATE**
PBW Corporate Health and Safety Director	Matt Wickham		
REVIEWED BY:			
TITLE	**NAME**	**SIGNATURE**	**DATE**
PBW Project Manager	Eric Pastor		
REVISIONS			
DATE	**DESCRIPTION**	**APPROVED BY**	**DATE**

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

1.0 PROJECT BACKGROUND

1.1 General Information

Site Name: Gulfco Marine Maintenance Superfund Site (Gulfco or "the site") **Site Location/Address**: 906 Marlin Avenue, Freeport, Texas	
Client Contact(s):	
Scott Magelssen The Dow Chemical Company Brent Murray Chromalloy American Corporation	Phone: 713-978-2398 Fax: 713-978-3448 Phone: 561-624-5747 Fax: 561-624-6877
Site Access Contact(s)	
Billy Losack LDL Coastal Limited, LP	Phone: 979-798-9252 (home) Cell: 210-215-7190
Regulatory Agency/Contact(s):	
Gary Miller US Environmental Protection Agency	Phone: 214-665-8318

1.2 Health and Safety Objectives

The overall health and safety objective is to perform the field tasks in a manner that minimizes the potential for accidents or injuries, and minimizes the potential for worker exposure to hazardous chemicals.

PBW will seek to instill in project workers the attitude that all accidents, injuries and exposures can be prevented, and that the goal of zero injuries, accidents and exposures is attainable. This will be done through the ongoing communication of PBW's safety expectations. There is no project issue that is more important than the safety of workers, including project schedule and budget.

This Site-Specific Health and Safety Plan ("HASP" or "the plan") is based on the primary concept of hazard identification and analysis. If the potential hazards can be identified early, the greater the potential that these hazards can be avoided. Hazards associated with the work tasks are identified in this HASP and each hazard has been evaluated using a Task Hazard Analysis (Appendix A).

Lastly, safety at the site will rely on the open communication between project workers at all times. This is based on the premise that while conducting field activities, all actions that you perform have the potential to affect other workers, and vice versa. A climate of open communication and intervention is necessary to ensure safe conditions at the site.

1.3 Site-Specific Health and Safety Plan Scope/Applicability

This HASP applies to the activities that are anticipated to be performed during the RI/FS at the Gulfco Marine Maintenance Superfund Site. The current list of potential tasks is provided in Section 3.1. As additional activities are added to the scope of work, the hazards associated with those activities will be evaluated and added to this HASP as addenda (Appendix D is reserved for HASP Addenda).

This HASP has been prepared to comply with the requirements of 29 CFR 1910.120 (b)(4). The primary

purpose of the plan is to provide the results of a hazard assessment conducted for the prescribed work tasks, and the health and safety requirements and protocols that will minimize hazards to site workers.

The provisions of this plan are mandatory for all personnel assigned to field work, including subcontractors or other persons or entities involved, for or on Pastor, Behling & Wheeler, LLC (PBW)'s behalf, in site operations conducted as part of this project. However, subcontractors are required to have their own health and safety program, and subcontractor employees bear the ultimate responsibility for all matters dealing with safety in the performance of their work. This responsibility includes the safety of all persons and property and any and all employees of subcontractors that may perform work on their behalf. Information provided by PBW to non-PBW employees at the site shall not constitute control over the means, methods and safety practices used by those parties to complete their work.

A copy of this plan will be kept on-site at all times during field activities. All field personnel will complete the Safety Compliance Agreement attached in Appendix B.

1.4 Site Description

The site is located in Freeport, Texas, along Marlin Avenue (Figures 1 and 2). Marlin Avenue bisects the site and is also referred to as County Road 756. The site is divided into "lots." Lots 55, 56, 57 and 58 are north of Marlin Ave. Lots 21, 22, 23 24 and 25 are south of Marlin Ave. The topography of the site is relatively flat. The site area north of Marlin Ave. consists mainly of a freshwater marsh with a large pond on Lot 55. A smaller pond exists at the southeastern edge of Lot 55 and continues offsite. A closed impoundment exists on Lot 56. The site area south of Marlin Ave. includes numerous structures and features:

- Two barge slips;
- A dry dock area;
- An elevated metal shed;
- A bermed area containing numerous above-ground storage tanks and miscellaneous containers, piping, etc. (referred to as the AST area);
- Multiple concrete slabs;
- Three groundwater monitoring wells;
- One inactive industrial water supply well (location unknown);
- Miscellaneous debris.

The southern boundary of the site is the Intracoastal Waterway.

2.0 PROJECT ORGANIZATION

TITLE	NAME	AFFILIATION	PHONE (Work)	PHONE (Other)
Project Manager (PM)	Eric Pastor	PBW – Austin	512-671-3434	512-750-9582 (cell)
Site Safety Officer (SSO)	Matt Wickham	PBW – Port Lavaca	361-553-6442	361-652-1756 (cell)
PBW Corporate H&S Director (HASD)	Matt Wickham	PBW – Port Lavaca	361-553-6442	361-652-1756 (cell)
Field Project Supervisor (FPS)	Eric Matzner	PBW – Austin	512-671-3434	512-422-9439 (cell)
	COMPANY NAME	**CONTACT**	**PHONE (Work)**	**PHONE (Other)**
	Benchmark Ecological Services, Inc.	Bill Quast	281-934-3403	281-703-7474 (cell)
Subcontractors	OTHERS TBD			
Others				

RESPONSIBILITIES:

Project Manager: The Project Manager (PM) has the responsibility for ensuring that the work is conducted in accordance with the RI/FS Workplan, RI/FS Sampling and Analysis Plan (RI/FS SAP) and this HASP. The specific safety responsibilities of the Project Manager are:

- Ensure that the General HASP and any addenda are available on-site;
- Ensure that safety and health equipment is procured on time and is available for field personnel;
- Ensure that all field personnel are properly trained in safety, health, and emergency response procedures;
- Coordinate the reporting of any accidents or injuries; and
- Interface with the Dow or Chromalloy representatives if any problems arise that require alterations to, or deviations from, the HASP.

Site Safety Officer: The Site Safety Officer (SSO) is the highest ranking safety officer. The SSO has the responsibility of ensuring that all personnel are properly trained and educated, that they abide by the specific health and safety policies, procedures and values contained in this HASP.

PBW Corporate Health and Safety Director: The PBW Corporate Health and Safety Director (HASD) is the ranking corporate health and safety official. The HASD monitors the PBW safety program status by tracking accident statistics and coordinating a program of audits and site visits to ensure conformance with established rules and procedures.

Field Project Supervisor: The Field Project Supervisor (FPS) is responsible for executing the safety, health, and emergency response procedures described in this HASP. The FPS is typically in the field for the majority of the time that work activities are conducted and therefore is the person that is most responsible for safety in the field. The responsibilities of the FPS are to:

- Continually observe field activities and evaluate potential hazards and ensure that all hazards are communicated to site workers, eliminated and/or minimized;
- Initiate contact with the SSO who will advise the emergency services (police, fire, medical) of the site activities and ensure the accuracy of the emergency phone numbers;
- Regularly coordinate field activities with Project Manager;
- Locate the on-site support facilities in an uncontaminated area and communicate to crew;
- Implement the safety, health, and emergency response training described in this HASP;
- Observe site activities to ensure the proper use of personal protective equipment and the proper application of safety practices;
- Take appropriate action, as described in this HASP regarding accidents, fires, or other emergency situations;
- Conduct daily safety training/review sessions for on-site personnel (Tailgate Safety Meetings);
- Conduct Safety Task Analysis Card (STAC) training daily;
- Ensure that daily work schedules integrate heat and cold stress prevention measures, as appropriate;
- Ensure that the field crews observe the work zones and decontamination procedures as described in this plan and in other applicable plans (RI/FS Workplan and RI/FS SAP);
- Ensure that safety equipment is properly maintained or disposed of;
- Ensure the proper handling and shipping of potentially hazardous samples;
- Ensure that appropriate monitoring is conducted and that personal protective equipment is selected based on the results of this monitoring;
- Initiate corrective action for any observed safety violation, and report unsuccessful attempts to correct a violation to the SSO or PM; and
- Stop work if unsafe conditions exist.

Field Project Staff: Field project staff conduct the majority of the work and are the most likely to be injured or exposed. All field project staff will be responsible for the following:

- Continually observe field activities and evaluate potential hazards and ensure that all hazards are communicated to site workers, eliminated and/or minimized;
- Becoming familiar and complying with the General HASP and any addenda;
- Attending training sessions to review the General HASP and other safety and information;
- Fill out and maintain on their person their STAC for each day in the field;
- Being alert to identified and non-identified hazards;
- Reporting newly-identified hazards to the FPS; and
- Offering suggestions, ideas, or recommendations that will improve or enhance site safety.

3.0 HAZARD ANALYSIS

3.1 Potential Work Tasks

This table contains a summary of potential work tasks to be performed. Task Hazard Analysis worksheets have been prepared for each task and are included in Appendix A. Personnel are required to at a minimum review the Task Hazard Analysis Worksheets for those activities that they will be performing.

TASK NO.	TASK	TASK DESCRIPTION
1	Site Visits and Inspections	Project and contractor/subcontractor personnel will be visiting the site to scope future investigations, conduct safety planning, evaluate site access, collect information with which to submit cost estimates/bids for certain activities, etc. These activities are broadly described as those that are non-intrusive and that do not require tools or equipment. Personnel without the proper training will not be allowed to perform intrusive activities such as sampling, drilling, well inspections, etc. This task also encompasses the activities performed by professional surveying crews.
2	Soil Sampling	Soil samples collected from multiple areas of the site during the RI/FS.
3	Groundwater Monitoring Well Installation	Groundwater monitoring wells and temporary well points installed at various locations at the site during the RI/FS.
4	Staff Gauge Installation	Staff gauges installed to monitor water-level fluctuations in the surface water bodies present at the site during the RI/FS.
5	Groundwater Sampling	Groundwater samples collected from the existing monitoring wells and temporary well points and permanent monitoring wells installed during the RI/FS.
6	Surface Water Sampling	Surface water samples collected from the wetlands and ponds present at the site during the RI/FS.
7	Marine Sampling	Sediment samples collected from the ponds, wetlands and the Intracoastal Waterway during the RI/FS. Biota samples collected from the Intracoastal Waterway.

3.2 Site-Specific Physical Hazards

Physical hazards and engineering controls were evaluated for each work task and are shown on the Task Hazard Analysis Worksheets contained in Appendix A. Chemical hazards are addressed below and on the Task Hazard Analysis Worksheets. General safe work practices that apply to all tasks are discussed in Section 3.6.

In general, the following are the primary physical hazards at the site for the work tasks:

1. Heat stress - the high temperatures and high humidity typical to the Texas gulf coast create a significant potential for heat stress-related illness.
2. Pinch-point hazards – the use of heavy equipment during drilling operations and other activities presents multiple pinch-point hazards.

3. Slip, trip and fall hazards – the large volume of work that will be conducted at any given time during the RI/FS, and the amount of equipment that will be needed to conduct this work, will present significant slip, trip and fall hazards.
4. Poisonous snakes – rattlesnakes have been observed on the site.
5. Drowning – Boat activities and the steep slopes and potentially poor or uncertain footing along the site boundary with the Intracoastal Waterway create the potential for drowning.

These hazards and the safe work practices that have been developed to reduce these hazards are discussed in more detail in Appendix A.

3.3 Site-Specific Chemical Hazards

The chemicals in the following tables have been detected in site environmental media at concentrations that exceed potential human health risk-based levels, or they were identified as the primary chemicals in the containers and/or tanks in the AST Area. Although the potential for exposure will be managed by the use of safe work practices, personal protective equipment, engineering controls, etc., during site activities, the physical and toxicological data are provided below. These tables may be revised as new data are collected at the site.

GENERAL PROPERTIES				
CONSTITUENT	**HAZARD CLASS (NFPA)**	**PHYSICAL STATE**	**POTENTIAL EXPOSURE ROUTES**	**TASKS INVOLVING POTENTIAL EXPOSURE**
Arsenic	Health: 3 Flammability: 0 Reactivity: 2	Solid (in soil)	Inhalation, Absorption, Skin and/or eye Contact, Ingestion	2, 7
Benzene	Health: 2 Flammability: 3 Reactivity: 0	Colorless to light yellow liquid with an aromatic odor	Inhalation, Absorption, Ingestion, Skin and/or eye contact	1, 2, 3, 5
Benzo(a)anthracene	Health: 2 Flammability: 0 Reactivity: 0	Black or dark-brown amorphous residue	Inhalation, Skin and/or eye contact	2, 7
Benzo(a)pyrene	Health: 2 Flammability: 0 Reactivity: 0	Black or dark-brown amorphous residue	Inhalation, Skin and/or eye contact	2, 7
Benzo(b)fluoranthene	Health: 2 Flammability: 0 Reactivity: 0	Black or dark-brown amorphous residue	Inhalation, Skin and/or eye contact	2, 7
Chloroform	Health: 3 Flammability: 0 Reactivity: 0	Colorless liquid with a pleasant odor	Inhalation, Absorption, Ingestion, Skin and/or eye contact	1, 2, 3, 5

1,1-Dichloroethene (1,1-DCE)	Health: 2 Flammability: 4 Reactivity: 2	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like	Inhalation, Absorption, Ingestion, Skin and/or eye contact	3, 5
1,1,1-Trichloroethane (1,1,1-TCA)	Health: 2 Flammability: 1 Reactivity: 0	Colorless liquid with a mild, chloroform-like odor	Inhalation, Ingestion, Skin and/or eye contact	1, 3, 5
1,2-Dichloroethane (1,2-DCA) Ethylene Dichloride	Health: 3 Flammability: 3 Reactivity: 0	Colorless liquid with a pleasant, chloroform-like odor [becomes acidic and darkens in color as it decomposes]	Inhalation, Ingestion, Absorption, Skin and/or eye contact	1, 2, 3, 5
Methylene Chloride	Health: 2 Flammability: 1 Reactivity: 0	Colorless liquid with a chloroform-like odor [Note: a gas above 104°F]	Inhalation, Ingestion, Absorption, Skin and/or eye contact	3, 5
Perchloroethylene (PCE) Tetrachloroethylene	Health: 2 Flammability: 0 Reactivity: 0	Colorless liquid with a mild, chloroform-like odor	Inhalation, Absorption, Ingestion, Skin and/or eye contact	1, 2, 3, 5
Trichloroethylene (TCE)	Health: 3 Flammability: 1 Reactivity: 0	Colorless liquid (unless dyed blue) with a chloroform-like	Inhalation, Absorption, Ingestion, Skin and/or eye contact	1, 2, 3, 5
Vinyl Chloride	Health: 2 Flammability: 4 Reactivity: 1	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations	Inhalation, Skin and/or eye contact (liquid)	3, 5

National Fire Protection Association (NFPA) Chemical Hazard Classification:

Health
4 = Danger – Highly toxic, may be fatal on short exposure, known or suspected human carcinogen
3 = Warning – Toxic or corrosive, may cause serious injury on short exposure, known or suspected animal carcinogen
2 = Warning – Moderately toxic, may cause injury on intense or continued exposure
1 = Caution – May cause irritation or minor injury
0 = No unusual hazard

Flammability
4 = Danger – Flammable gas or extremely flammable liquid flash point <73_F
3 = Warning – Flammable liquid flash point below 100_F but >73_F
2 = Caution – Combustible liquid flash point >100_F but <200_F
1 = Combustible if heated, flash point >200_F
0 = Not combustible

Reactivity
4 = Danger – Explosive material at room temperature
3 = Danger – May be explosive if shocked, heated under confinement, or mixed with water
2 = Warning – Unstable or may react violently if mixed with water
1 = Caution – May react if heated or mixed with water, but not violently
0 = Not reactive when mixed with water

Special Precautions
W = Water reactive
OX = Oxidizing Agent

Physical state and Potential Exposure Routes obtained from NIOSH, Pocket Guide to Chemical Hazards, Feb. 2004.

EXPOSURE LIMITS				
CONSTITUENT	**EXPOSURE LIMIT (ACGIH/OSHA/NIOSH)**	**STEL**	**IDLH**	**LEL**
Arsenic	ACGIH: 0.01 mg/m^3 OSHA: 0.010 mg/m^3 NIOSH: Ca; C 0.002 mg/m^3 (15 min)	-	Ca; 5 mg/m^3	NA
Benzene	ACGIH: 0.5 ppm OSHA: 1 ppm NIOSH: Ca; 0.1 ppm	ACGIH: 2.5 ppm OSHA: 5 ppm NIOSH: 1 ppm	Ca; 500 ppm	1.2%
Benzo(a)anthracene	ACGIH: -[1] OSHA: 0.2 mg/m^3 (benzene-soluble fraction) NIOSH: Ca; 0.1 mg/m^3 (cyclohexane extractable fraction)	-	Ca; [80 mg/m^3]	Dependent upon the specific compound
Benzo(a)pyrene	ACGIH: -[1] OSHA: 0.2 mg/m^3 (benzene-soluble fraction) NIOSH: Ca; 0.1 mg/m^3 (cyclohexane extractable fraction)	-	Ca; [80 mg/m^3]	Dependent upon the specific compound
Benzo(b)fluoranthene	ACGIH: -[1] OSHA: 0.2 mg/m^3 (benzene-soluble fraction) NIOSH: Ca; 0.1 mg/m^3 (cyclohexane extractable fraction)	-	Ca; [80 mg/m^3]	Dependent upon the specific compound
Chloroform	ACGIH: 10 ppm OSHA: C 50 ppm (240 mg/m^3) NIOSH: Ca	NIOSH: 2 ppm (9.78 mg/m^3)[60-min]	Ca; 500 ppm	NA
1,1-Dichloroethene (1,1-DCE)	ACGIH: 5 ppm OSHA: None NIOSH: Ca	-	Ca; [N.D]	6.5%
1,1,1-Trichloroethane (1,1,1-TCA)	ACGIH: 350 ppm OSHA: 350 ppm (1900 mg/m^3) NIOSH: C 350 ppm (1900 mg/m^3) [15-min]	ACGIH: 450 ppm	700 ppm	7.5%
1,2-Dichloroethane (1,2-DCA) Ethylene Dichloride	ACGIH: 10 ppm OSHA: 50 ppm; C 100 ppm, 200 ppm [5-min max peak in any 3 hrs] NIOSH: Ca; 1 ppm (4 mg/m^3)	NIOSH: 2 ppm (8 mg/m^3)	Ca; 50 ppm	6.2%
Methylene Chloride	ACGIH: 5 ppm OSHA: 25 ppm NIOSH: Ca	NIOSH: 125 ppm	Ca; [2300 ppm]	13%
Perchloroethylene (PCE) Tetrachloroethylene	ACGIH: 25 ppm OSHA: 100 ppm; C 200 ppm, 300 ppm (5-min max peak in any 3 hrs) NIOSH: Ca; Minimize workplace exposure concentrations	ACGIH: 100 ppm	Ca; 150 ppm	NA

Trichloroethylene (TCE)	ACGIH: 50 ppm OSHA: 100 ppm; C 200 ppm, 300 ppm (5-min max peak in any 2 hrs) NIOSH: Ca	ACGIH: 100 ppm	Ca; 1000 ppm	8%
Vinyl Chloride	ACGIH: 1 ppm OSHA: 1 ppm; C 5 ppm [15-min] NIOSH: Ca	-	Ca [N.D.]	3.6%

Notes:
1) Exposure by all routes should be carefully controlled to levels as low as possible. (ACGIH)
ACGIH: **TLV-TWA** = *Threshold Limit Value-Time Weighted Average* - "The TWA concentration for a conventional 8 hour workday and a 40-hour workweek, to which it is believed that nearly all workers may be repeatedly exposed, day after day, for a working lifetime without adverse effect." (ACGIH, Threshold Limit Values and Biological Exposure Indices, 2004)
OSHA: **PEL** = *Permissible Exposure Limit* – "…TWA concentrations that must not be exceeded during any 8-hour workshift of a 40-hour workweek." (NIOSH, Pocket Guide to Chemical Hazards, February 2004)
NIOSH: **REL** = *Recommended Exposure Limit*- "…RELs are time-weighted average (TWA) concentrations for up to a 10-hour workday during a 40-hour workweek." (NIOSH, 2004)
C = *Ceiling* – value which should not be exceeded at any time (NIOSH, 2004)
Ca = *Carcinogen* – Any substance that NIOSH considers to be a potential occupational carcinogen
STEL = *Short Term Exposure Limit* – "a 15-minute TWA exposure that should not be exceeded at any time during a workday" (NIOSH, 2004)
IDLH = *Immediately Dangerous to Life or Health Concentrations* – "a condition 'that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment.'" (NIOSH, 2004)
LEL = Lower Explosive Limit
ppm = parts per million; **mg/m^3** = milligrams per cubic meter
NA = Not Available **ND** = Not Determined

WARNING PROPERTIES/EXPOSURE SYMPTOMS	
CONSTITUENT	**EXPOSURE SYMPTOMS**
Arsenic	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, potential occupational carcinogen.
Benzene	Irritation of eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, weakness/exhaustion; dermatitis; bone marrow depression; potential occupational carcinogen.
Benzo(a)anthracene	Dermatitis; bronchitis; potential occupational carcinogen.

Benzo(a)pyrene	Dermatitis; bronchitis; potential occupational carcinogen.
Benzo(b)fluoranthe	Dermatitis; bronchitis; potential occupational carcinogen.
Chloroform	Irritation of eyes, skin; dizziness, mental dullness, nausea, confusion; headache, weakness/exhaustion; anesthesia; enlarged liver; potential occupational carcinogen.
1,1-Dichloroethene (1,1-DCE)	Irritation of eyes, skin, throat; dizziness, headache nausea, difficulty breathing; liver, kidney distress; pneumonitis; potential occupational carcinogen.
1,1,1-Trichloroethane (1,1,1-TCA)	Irritation of eyes, skin; headache, weakness/exhaustion, CNS depression, poor equilibrium; dermatitis; cardiac arrhythmias (disturbance in the regular rhythm of the heartbeat); liver damage.
1,2-Dichloroethane (1,2-DCA) Ethylene Dichloride	Irritation to eyes, corneal opacity; CNS depression; nausea, vomiting; dermatitis; liver, kidney, CVS damage; potential occupational carcinogen.
Methylene Chloride	Irritation to eyes, skin; weakness/exhaustion, drowsiness, dizziness; numbness, tingling limbs; nausea; potential occupational carcinogen.
Perchloroethylene (PCE) Tetrachloroethylene	Irritation to eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin redness; liver damage; potential occupational carcinogen.
Trichloroethylene (TCE)	Irritation to eyes, skin; headache, visual disturbance, weakness/exhaustion, dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias (disturbance in the regular rhythm of the heartbeat), paresthesia (tingling, pricking, or numbness sensation); liver injury; potential occupational carcinogen.
Vinyl Chloride	Weakness/exhaustion, abdominal pain, GI bleeding; enlarged liver; pallor or cyan of extremities; liquid: frostbite; potential occupational carcinogen.

3.4 Hazardous Chemicals Used to Perform On-Site Tasks

TASK NO.	TASK	CHEMICAL	HAZARD CLASS (NFPA)	PHYSICAL STATE	COMMENTS
2-7	Various	Acids/Bases	Health: 3 Flammability: 0 Reactivity: 0 Other: Oxidizer	Liquid	Acids (nitric, hydrochloric) or bases (sodium hydroxide) are often used as preservatives for certain samples. The preservative is typically placed in the sample containers by the laboratory before being shipped to the field. This is the preferred method. Preservative is sometimes added to the sample container by field personnel at the time of sample collection, but this practice is discouraged due to the potential for contact with the acid. Regardless, personnel shall wear the appropriate personal protective equipment

					(nitrile or butyl rubber gloves and goggles) while handling sample containers that contain acids/bases and shall limit contact with the preservative.

Notes:

Material Safety Data Sheets for hazardous chemicals used to perform on-site tasks will be kept at the site and made available to site personnel by the FPS.

3.5 Workplace Safety Surveys

The Project Manager, Site Safety Officer and Field Project Supervisor will survey the site for potential work hazards at the beginning of each primary field mobilization. The Field Supervisor shall continually survey the site for potential work hazards and relate any new information to site personnel at the Tailgate Safety Meeting and STAC training (Section 4.3) held each day prior to beginning field activities. Additional site safety surveys or safety audits will be performed (1) in the event of an accident, injury, or illness related to the site; (2) whenever a new substance, process or piece of equipment is introduced that was not contemplated in this HASP; (3) whenever a safety deficiency is noted; (4) when a new hazard is recognized and needs to be evaluated; or (5) periodically as needed.

3.6 General Safe Work Practices

The following work practices will be instituted in order to limit worker exposure to contaminants and other hazards.

1. If you observe an unsafe condition or behavior, you must immediately intervene to correct the unsafe condition or behavior. All workers are expected to intervene with all other site workers, even those who work for different companies.
2. Each worker is empowered to stop the job to correct an unsafe condition or behavior.
3. Take breaks and drink water (outside of the work area and decontamination area) to mitigate the effects of heat stress.
4. Unauthorized persons will not be allowed in the work areas. Non-essential personnel will maintain an appropriate distance from heavy equipment, drilling operations, sampling, etc.
5. No eating, drinking, chewing gum or using tobacco products will be permitted in the work areas or decontamination area. All personnel shall wash their hands and face prior to eating or leaving the site.
6. Use of disposable lighters is prohibited on the site.
7. Employees must be physically fit and properly trained in both health and safety procedures and specific field activity procedures prior to performing any field activities
8. Employees must inspect the job site for safety hazards prior to beginning any field activities. The Field Project Supervisor will inform all employees of the potential hazards of the job during the initial Tailgate Safety Meeting and will review potential hazards daily during the Tailgate Safety Meeting and STAC training.
9. All field personnel shall immediately report any accident or injury to the Field Project Supervisor. This includes minor or slight injuries and near-miss events.
10. Employees are required to keep their work environment clean and orderly.

11. Changes in work activities, procedures or rules that involve deviations from the Site Health and Safety Plan, or that introduce new hazards, will be implemented only after approval by: (1) the Project Manager; and (2) the Site Safety Officer.
12. Horseplay, practical joking, or any other actions that jeopardize safety will not be tolerated.
13. All personnel will avoid contact with potentially contaminated substances. Walking through the lagoons, puddles or mud, kneeling on the ground, or leaning against drums will be avoided whenever possible.
14. Field personnel must observe each other for signs of toxic exposure. Indications of adverse effects include, but are not limited to: (1) changes in complexion and skin discoloration; (2) changes in coordination; (3) changes in demeanor; (4) excessive salivation and pupillary response; (5) changes in speech pattern.
15. Field personnel will inform each other of non-visual effects of toxic exposure such as headaches, dizziness, nausea, blurred vision, cramps or irritation of eyes, skin, or respiratory tract (see Section 3.3).
16. Measures to provide secure footing shall be taken at all locations where personnel will be working.
17. Whenever solvents, cleaners, or other chemical substances are used, a properly completed Material Safety Data Sheet for the chemicals will be available at the work site, and these containers will be appropriately labeled.
18. Always stay upwind of any intrusive sampling activity, to the extent practicable.
19. Follow all emergency procedures explicitly.
20. Be aware of site conditions, and especially any changes in conditions. If an unsafe condition is encountered, rectify and/or report it immediately.
21. If a person observes unsafe behavior by any other person, it is their duty to immediately communicate their concern to the other person. If they are uncomfortable doing so, the person should report the behavior to the FPS.
22. If other people are present or working nearby, always check in with the FPS or other appropriate personnel to coordinate your activities and request their cooperation.
23. Employees shall follow all client-designated safety procedures.
24. Inspect, clean and maintain personal protective equipment issued to you on a daily basis when in use. Report any defects in the equipment immediately to the FPS or replace.
25. Anticipate local weather conditions. Wear appropriate clothing and bring extra clothing/rain gear.
26. Beards or long sideburns will not be allowed on sites where respiratory protection may be required, since they interfere with respiratory protection. Trimmed sideburns and mustaches are acceptable, provided they do not interfere with respiratory protection. Report to work clean-shaven when there is a potential need for the use of respiratory protection.
27. Use only the equipment for which you are trained and qualified.

4.0 PERSONNEL TRAINING

4.1 Required Training

All PBW personnel, contractors and subcontractors engaged in work involving potential exposure to hazardous chemicals at the site (i.e., those performing all tasks with the exception of Task 1, Site Visits and Inspections) will have completed training in accordance with OSHA Standard 29 CFR 1910.120 (e). Records for personnel training are kept in accordance with 29 CFR 1910.120 and copies are available from the Corporate Health and Safety Director. At a minimum, all personnel shall have the following health and safety training:

- A 40-Hour OSHA HAZWOPER training course.
- Current annual OSHA HAZWOPER refresher course.

The Field Project Supervisor shall have completed an additional 8-Hour OSHA Supervisor training course. The Site Safety Officer and Field Project Supervisor shall hold a current certificate for first aid and CPR training.

PBW will obtain and verify all records from contractors and subcontractors documenting the training prior to the subcontractor performing any work on the site.

Personnel that will visit the site for certain non-intrusive activities may not be required to have the training listed in the first paragraph of this section. Personnel visiting the site for the purposes of viewing site activities, general inspection of the site, site walks related to project bidding, etc., may be considered for this exclusion at the discretion of the PBW Project Manager.

4.2 Pre-Job Safety Meeting

Any person that will enter the site for any reason will participate in a pre-job safety meeting. The pre-job safety meeting is to be administered by the Project Manager, Site Safety Officer, or Corporate Health and Safety Director. The main objective of the pre-job safety meeting is to review the information in this HASP. The pre-job safety meeting is to be documented with the form contained in Appendix B. All personnel attending the meeting will have to sign the form.

It is anticipated that a pre-job safety meeting will be held prior to the initiation of major field activities at the site, and should include all personnel reasonably expected to participate in the activities covered by this plan. Additional pre-job safety meetings will be held as needed.

4.3 Safety Task Analysis Card

Safety Task Analysis Cards (STAC) will be completed by each person during the pre-job safety meeting and the daily Tailgate Safety Meetings. Each person will keep their STAC on their person each day. The STAC process will be directed by the Project Manager or Field Project Supervisor who have been trained in STAC use. STAC is a tool that was developed by Dow and has been in use by Dow since 1995. This tool has resulted in a significant reduction in recordable injury rates. The STAC process provides the mechanism for site personnel to learn recognize the hazards they may encounter during site activities, and evaluate the manner in which the hazards may be eliminated and controlled. Task analysis breaks a specific job into small parts that are then evaluated individually. The activities to be evaluated using the STAC will be chosen by the Project Manager or Field Project Supervisor.

An example STAC is provided in Appendix B. Each worker will complete an individual STAC at each Tailgate Safety Meeting and when new hazards are encountered during the day (re-STAC).

4.4 Safety Compliance

All personnel that enter the site for any reason will have to review and understand this HASP. Personnel will acknowledge that they have read the HASP and agree to abide by its requirements by signing the Safety Compliance Agreement form included in Appendix B. Personnel that will visit the site for certain non-intrusive activities such as viewing site activities, general inspection of the site, site walks related to project bidding, etc., will be restricted from entering areas where work is being performed and where there is a potential for exposure to physical or chemical hazards.

4.5 Tailgate Safety Meetings

Tailgate Safety Meetings (TSMs) will be conducted daily to discuss site activities and task-specific hazards. Forms documenting the TSMs are included in Appendix B. TSMs will be conducted according to the following schedule:

- Every day before work begins which involves more than one person.
- Every time a new individual enters the Work Area that did not attend the morning TSM or the Pre-Job Safety Meeting.

4.6 Additional Training Requirements

1. Any personnel that will engage in activities requiring, or potentially requiring, the use of respiratory protection must have an annual respirator fit test in accordance with OSHA 1910.134 and use the respirator brand and size indicated on the certificate.

2. In some cases, site- or client-specific training may be required for personnel to access a particular site. The client or site owner will dictate what training is required.

5.0 PERSONAL PROTECTIVE EQUIPMENT

PPE LEVEL SELECTION									
Work will be performed using what level PPE:									
	Level A		Level B		Level C		Modified Level D	X	Level D
PPE may be upgraded to:									
	Level A		Level B	X	Level C	X	Modified Level D		Level D
All personnel who enter the site will be required to wear Level D PPE. Upgrades to Modified Level D or Level C may be necessary depending on site conditions and/or air monitoring. Current respirator fit testing documentation is required for personnel who may upgrade to Level C PPE attire.									

PPE UTILIZATION TABLE	
PPE	**UTILIZATION REQUIREMENTS**
Hard Hat (ANSI Z 89.1)	At all times (all PPE levels)
Leather Steel-toe boots (ANSI Z 41.1)	At all times (all PPE levels), except when inside the bermed AST Area if ponded water present
Rubber Steel-toe Boots	When inside bermed AST Area if ponded water is present (may be allowed during other activities if ponded water is present, during rain events, etc., at the discretion of the Project Manager or Field Project
Safety Glasses/Sunglasses (ANSI Z 87.1)	At all times (all PPE levels, except when full-face respirators are used)
Hearing Protection	At all times near operating machinery (use arms length rule); when noise level exceeds 85 dB
Chemical Resistant Gloves (Nitrile)	When within the AST area (the bermed areas)
Cotton or Leather Work Gloves	As needed to mitigate hand/finger hazards identified in Tailgate Safety Meeting and documented on worker STAC cards.
Rain gear; cold weather gear	As necessary
Tyvek or other protective suit	When conditions exist where potential exposure to contaminated soil or water is indicated (by air monitoring but below action levels, or by existing analytical data) or when working in wet conditions (Modified Level D). Required when in Level C PPE.
Bright-colored Orange Traffic Safety Vest	Optional
Half-Face Respirator	As required when air monitoring indicates their need (Level C)
Full Face Respirator	As required when air monitoring indicates their need (Level C)
Snake Leggings or similar leg protection	When walking in vegetated areas of the site.

Goggles or Face Shield	Required when exposure to high-pressure liquids is possible (steam cleaner)
Life Vests (personal flotation devices)	When working on the water or on a boat.
Other: Construction attire	100% cotton clothing; blue jeans; shirts with minimum 4" sleeves; long hair must be restrained; no dangling jewelry
Types of respirator cartridges that will be available on-site: Organic vapor cartridge with dust, aerosol or particulate pre-filter.	
Specify how often respirator cartridges will be changed: Organic vapor cartridge replacement frequencies will be determined based on the concentrations of organic compounds present in the ambient air. If respirators are donned, the concentration of organic vapors will be measured, and compared against the cartridge manufacturers guidelines. With respect to dust pre-filters, the pre-filter will be replaced when the wearer notices an increased effort is required to draw air through the filter.	

6.0 MEDICAL SURVEILLANCE

Medical exams meeting the requirements of 29 CFR 1910.120 (f) will be required for all personnel with the potential for exposure to hazardous substances (all Tasks except Task 1). Medical surveillance will include a baseline and annual exams conducted or reviewed by a licensed physician or under the supervision of a licensed physician. Each contractor will maintain the medical surveillance records for their employees. Upon request, they will provide a copy of the "Physician's Written Opinion," or approval for site work, to the Project Manager or Field Project Supervisor.

Anyone who may be required to wear a respirator must be approved to do so by qualified medical personnel. The approval process will include a pulmonary function test and respiratory questionnaire (29 CFR 1910.134, Appendix C).

On-site personnel who may be exposed to noise levels above 85 dbA must be included in a Hearing Conservation Program, which includes audiometric testing. In addition, some activities may necessitate the use of hearing protection and inclusion in a Hearing Conservation Program (e.g., some drilling operations).

Workers who have experienced a known or suspected chemical exposure will be evaluated by a medical professional. Any known or suspected exposures will be documented and kept in the employee's files. Employees can request copies of any medical records.

Specific medical surveillance tests may be required as new data are acquired at the site (e.g., for certain heavy metals if they are found at levels that may indicate potential exposure). This HASP will be amended if these tests become necessary.

7.0 EXPOSURE MONITORING

7.1 Monitoring Instruments

(Check all that apply)

X	Photo Ionization Detector (PID)		Flame Ionization Detector (FID)	X	Combustible Gas Indicator (CGI) Lower Explosive Limit (LEL)/Oxygen	X	Dust Monitor		Hydrogen Sulfide
	Sorbent Tubes (List):								
	Other (List):								

Additional comments: Monitoring of the ambient air in the vicinity of the AST area will be conducted upon the initial site visit or inspection. A PID calibrated to 100 ppm isobutylene is required. Calibration procedures will be performed in accordance with the manufacturer's written instructions. See Section 7.2. Monitoring of ambient air in the breathing zone of workers for organic vapors and dust will be conducted for intrusive activities conducted at upland locations (Tasks 2, 3 and 5). Monitoring of the lower explosive limit will be conducted when working around or inside the Former AST Tank Farm.

7.2 Action Levels

CONSTITUENT	ACTION LEVEL	MEDIUM	REQUIRED ACTION
Organic Vapors	10 ppmv	Air	See below
LEL	10%	Air	See below
Dust	None (see below)	Air	See below

Action levels have been developed for this site to provide a safe level of exposure in which project workers may perform their activities. When the established action levels are exceeded, certain actions will be taken to limit potential exposure. Engineering controls will be implemented first whenever possible. When engineering controls are not possible or prove to be insufficient, PPE will be used to limit potential exposure. Airborne dust containing metals and organic vapors (some of which are explosive) are the primary sources of exposure to site workers.

The level of PPE worn by field personnel will be defined, controlled and implemented by the Field Project Supervisor. Protection may be upgraded or downgraded by the FPS on the basis of the action levels presented in this section.

Upon initial entry to the site, the PID should be walked around the site, particularly the AST area, at a height equal to the approximate breathing zone of site workers. If a sustained reading (more than 60 seconds) of greater than 10 ppm is observed, the area shall not be entered by site visit personnel. Initial site entry monitoring is only required for the first visit to the site. If action levels are not reached, monitoring will not be required subsequently upon site entry (but will be required for intrusive activities as described below). The action level is a conservative value based on the TLV for chloroform. Chloroform has been identified as a chemical present in potentially large volumes at the AST area.

During intrusive activities at upland locations (Tasks 2, 3 and 5), the breathing zone of workers will be monitored for organic vapors and dust. Monitoring instrument readings will be entered on a Daily Field Record or in a Field Notebook. The criteria for upgrading to a higher level of respiratory protection are as follows:

Organic Vapors: As for the initial site entry, a PID will be used to measure the concentration of total organic vapors in the breathing zone of workers. If a sustained reading (more than 60 seconds) of 10 ppmv is measured, work activities will cease at that location. The FPS will continue to monitor the area every five minutes for 15 minutes (three times). If concentrations of organic vapors do not subside below the action level, the area will be cleared and work at that location will not continue until all workers have donned respiratory protection (half-face respirator with an organic vapor cartridge). Engineering controls may be attempted to disperse the vapors, for instance the use of industrial fans.

Lower Explosive Limit: The lower explosive limit is used to ensure that explosive vapors (typically organic vapors from volatile compounds such as chloroform) do not gather in the work area. An LEL meter will be used to monitor the air in the work area (both in the breathing zone and at ground level). If an LEL meter (combustible gas indicator) measures 10% LEL (calibrated as methane) near the work area, activities will cease and the area cleared. The FPS will continue to monitor the area every five minutes for 15 minutes. If LEL measurements do not subside below the action level, work at that location will not continue. Engineering controls will be used to disperse the vapors, and all equipment will be moved from the area. The location will be flagged and barricaded and no further work will be conducted in the work area.

Dust: Exposure from airborne dust containing metals and/or polynuclear aromatic hydrocarbons (PAHs) has been considered during the preparation of this HASP. Metals and PAHs that have been previously measured in site soils at concentrations exceeding potential human-health risk-based levels include arsenic, benzo(a)anthracene, benzo(a)fluoranthene and benzo(a)pyrene. However, there are very limited site data for these constituents in site soils. A typical method for calculating action levels for exposure monitoring in ambient air considers the average concentration of a constituent in soil samples, the OSHA permissible exposure limit for that constituent, and a safety factor (typically 10% to 25%). Attempts to calculate such an action level using maximum site metal and PAH concentrations resulted in elevated action levels that do not support the need for dust monitoring. Therefore, dust monitoring will not be conducted initially. As new site data are collected, and actual dust conditions are observed during field activities, the need for dust monitoring and an associated action level will be re-evaluated. Engineering controls such as using water or plastic sheeting to mitigate dust concerns may be used, as described in the Task Hazard Analysis Worksheets (Appendix A)

Exposure monitoring data and site sample data will be used to continually review the exposure monitoring program. The HASD and PM together may determine that exposure monitoring either be reduced or eliminated. These decisions will be reviewed with the client representative(s), and if approved, may be implemented during subsequent work activities at the site.

8.0 SITE CONTROLS

Is the Site securely fenced? The part of the site south of Marlin Ave. is partially fenced but is generally accessible. The part of the site north of Marlin Ave. is not fenced and is accessible. No Trespassing signs are

What types of people routinely have access to the site (List):
Typically, only the site owners have access to the site. The owners will allow PBW employees, their subcontractors, and authorized visitors access when necessary.

The Work Area will be marked with (check any that apply):

X	Traffic cones		Barricades		Caution tape		Signs		Fence
	Other:								

Briefly describe the location of the work area:

For site visits and inspections (Task 1), the entire site is considered the work area. However, there will be no intrusive work performed and therefore there will be no work areas restricted or otherwise identified under that task.

For all intrusive tasks performed at upland locations (Tasks 2, 3 and 5), the work area around the sampling location (or sampling area) will be marked with traffic cones. The traffic cones shall be no nearer than 10 feet from the sampling location if at all possible.

Briefly describe the location of the decontamination area:

A decontamination area will be established at the site prior to initiation of field activities. The area will be centrally located. The decontamination area will be the area where all decontamination activities will be performed. These activities generally include (1) decontamination of field equipment; and (2) removal and disposal of PPE. The following decontamination equipment will be provided at the decontamination area:

Water supplies (gallon containers, small spray bottles, a large pressurized sprayer)
Towels and disposable wipes
Brushes
Garbage cans and/or drums for disposal of PPE and other potentially contaminated trash
Large tubs or wading pools for decontamination of boots, if necessary
Soap (liquid hand soap and Alconox or similar)
Plastic sheeting or tarps

A separate area near or within the decontamination area will be constructed for decontamination of downhole equipment such as hollow-stem augers, etc. A steam-cleaner will be used to decontaminate this type of equipment. This area will be bermed and all water/solids will be contained.

Briefly describe the location of the support zone:

The support zone is any area outside the work areas or decontamination area. The support zone shall be a clean zone and is where meetings and breaks are held. Eating and drinking is allowed in the support zone. Table(s), chairs, shade and drinks will be provided in the support zone. A First Aid Kit will also be available in the support zone.

9.0 DECONTAMINATION

Decontamination procedures for specific work activities will be presented in the RI/FS Sampling and Analysis Plan RI/FS SAP). The decontamination procedures below are general and will be superseded by those in the RI/FS SAP, if applicable.

ACTIVITY	DECONTAMINATION PROCEDURE
Emergency Decontamination	If a life-threatening situation dictates immediate medical treatment, decontamination will be delayed until the victim's condition is stabilized. If decontamination can be performed without interfering with essential first aid, decontamination will be performed immediately. Decontamination in such instances will be as complete as possible to limit the exposure of the injured person and those responding to the emergency. Any vehicle or person involved in transporting contaminated personnel will be decontaminated as necessary following the emergency response. If there is an immediate threat to the life and health of a person who may have been contaminated, co-workers will need to determine whether or not full decontamination procedures will be followed, or if more limited procedures are preferable. Remember that if complete decontamination is not performed, medical responders will be advised of this and as to what contaminants may be present.
Personal Hygiene	All on-site personnel will deposit disposable gloves and disposable coveralls in a designated PPE waste container, wash off their boots, and wash their hands and face whenever leaving the site and before eating, drinking, smoking, or using restroom facilities. Washing facilities will be provided to all workers.
Equipment Decontamination	All sampling equipment will be thoroughly decontaminated before it is used for sample collection, moved to a "clean" or support area, or removed from the site. This will prevent the migration of contaminants from contaminated to uncontaminated areas. The RI/FS Workplan will include specific procedures to follow for each type of equipment and each sampling activity. High pressure/temperature water cleaning of equipment (e.g., augers) will be performed when this equipment is required for a specific field effort. Site workers conducting high pressure/temperature cleaning of equipment are required to wear goggles or a face shield. Rubber boots or shoe covers are recommended.

10.0 HANDLING AND STORAGE OF INVESTIGATION DERIVED WASTES

The following investigation-derived wastes are expected to be generated (check all that apply):									
X	Soil cuttings	X	Decontamination wash water	X	Purged groundwater	X	PPE	X	Plastic sheeting
X	Equipment (describe): sampling equipment (tubing, bailers, sample barrel liners, etc.)								
	Other (describe):								

Describe the method of waste storage:

All investigation derived wastes (IDW) will be stored in the work areas or decontamination area until testing indicates its appropriate disposal method and location. An IDW waste analysis plan will be provided in the RI/FS SAP.

11.0 EMERGENCY RESPONSE PLAN

11.1 Introduction

As a result of the hazards on site and the conditions under which the RI/FS will be conducted, the possibility of an emergency situation exists. Careful consideration has been given to the relative possibility of fire, explosion, or release of vapors, dusts, or gases that could affect personnel or any nearby facilities. Control measures will be employed as necessary to preclude offsite migration of contaminants.

The FPS is designated as the Project Emergency Coordinator and will implement the emergency plan whenever conditions at the site warrant such action. He/she will be responsible for ensuring the evacuation, emergency treatment, emergency transport of all site personnel as necessary, and notification of emergency response units and the appropriate management personnel.

11.2 Emergency Procedures

In case of injury, administer first aid immediately and, if necessary, transport to nearest medical facility as soon as possible or call an ambulance. Advise the PBW Project Manager, SSO and Corporate Health and Safety Director as soon as possible of any injury, accident, property damage or near-miss event.

In the event evacuation is necessary, first safely shut off all operating equipment, if possible. Proceed in a quick and orderly manner to the hospital.

All injuries and accidents will be dealt with in a manner to minimize continued health risk to site workers:

- First aid or other appropriate initial action will be administered by those closest to the accident or injury. This assistance will be provided in a manner that will assure that those performing the activities are not placed at unacceptable risk.
- All accidents will be reported to, and documented by, the FPS, who is responsible for coordinating the emergency response actions in an efficient, rapid and safe manner.
- Employees will be responsible for conducting themselves in a mature, calm manner in the event of an accident or injury.

In the event of an emergency situation, such as fire, explosion, significant release of contaminants, etc., the FPS will notify site personnel and initiate site evacuation procedures. Personnel in all areas will evacuate and assemble in the support zone or other safe area identified by the FPS. Under no circumstances will incoming personnel or visitors be allowed to proceed into the work areas once an emergency has been declared. The FPS will ensure access for emergency equipment and verify that all equipment is shut down. While the safety of all on-site personnel is being confirmed, emergency response teams will be notified of the emergency and other appropriate personnel and agencies will be notified subsequently.

Emergency contacts and the locations of emergency equipment are listed in the following tables.

CONTACT	PHONE NUMBER
Fire/Rescue:	911
Ambulance:	911
Police:	911
Nearest Hospital: Brazosport Memorial Hospital, 100 Medical Drive, Lake Jackson, TX HOSPITAL DIRECTIONS ARE IN APPENDIX C	979-297-4411
Utility Locator Company: Texas Excavation Safety System (TESS)	800-344-8377

EMERGENCY EQUIPMENT	LOCATION
First Aid Kit	In support zone.
Fire Extinguisher (ABC type)	One in support zone. One for each field vehicle and piece of heavy equipment.
Cellular Phone	In support zone.
Spill Kit	In support zone (see Section 13.0)
Eye Wash	In support zone.
Drinking Water	In support zone.
Wipes for face and hands	In support zone.
Other:	

11.3 Medical Emergencies

If an injury to a worker is chemical in nature (e.g., overexposure), the following first-aid procedures will be instituted:

- Eye Exposure – If contaminated solid or liquid gets into the eyes, wash the eyes immediately, lifting the lower and upper lids. Contact lenses will not be worn when working on site.
- Skin Exposure – If contaminated solid or liquid gets on the skin, promptly wash the contaminated skin using soap or mild detergent and water.
- Swallowing – If contaminated solid or liquid has been swallowed, immediately contact the Poison Control Center, give information on the type of material, the amount swallowed, and the expected concentration. Follow the Poison Center's advice for treatment. Obtain medical attention immediately if signs of overexposure develop.
- Breathing – If a person has difficulty breathing, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.

All accidents and injuries will be documented by the FPS.

11.4 Adverse Weather

In the event of adverse weather, the FPS will determine if work can continue without risking the health and safety of site personnel. Factors to be considered in making this determination include:

- Heavy rainfall;
- Potential for heat stress;
- Potential for cold stress;
- Hurricanes/tropical storms;
- Limited visibility;
- Electrical storms; and
- Malfunctioning of monitoring equipment (due to high humidity, etc.).

11.5 Incident Investigation

Upon receiving a report of an incident, the SSO or FPS will investigate the circumstances surrounding the incident. All incidents will be reported to the Project Manager and Corporate Health and Safety Director. A written report will be completed and forwarded to the Client Representative(s) within 48 hours of the incident.

12.0 CONFINED SPACE ENTRY

Confined space entry is not permitted under this HASP under any circumstance. If entry into a confined space is necessary, a confined space entry plan and permit system must first be prepared and approved b the Project Manager, the Corporate HASD and the Client Representative(s).

13.0 SPILL CONTAINMENT

It is not expected that significant releases will result from the activities covered by this plan. Therefore, this spill containment plan only covers small spills or minor releases.

The FPS will ensure that the appropriate spill control equipment is available to handle small, incidental spills occurring during the field effort (e.g., spill of a liter of acidic preservation solution). This equipment shall include:

- Spill pillows or “pigs”;
- Shovels;
- Heavy-duty plastic trash bags or drums;
- Labels.

The FPS will take actions to control and clean up the spill and will document the incident and provide copies to the SSO and PM. If applicable, corrective actions will be taken to prevent a similar occurrence.

14.0 FALL PROTECTION

Work on ladders or elevated structures more than 6 feet high is not permitted under this HASP. If such work is anticipated, a fall protection plan complying with client and OSHA standards must first be prepared and approved by the Project Manager, the Corporate HASD and the client representative(s).

15.0 RECORDKEEPING AND REPORTING

15.1 Forms

The following forms will be kept by the FSP and retained in the project files:

- Training records:
  - Site training
  - Records of Pre-Job Safety Meetings, Tailgate Safety Meetings, STACs
  - Required training certifications (HAZWOPER, MSHA)
  - Medical Surveillance records
- Emergency reporting:
  - First Report of Injury· Accident Investigation Report
- Security:
  - Daily Field Records showing workers and visitors to the site
- Monitoring (calibrations and results)
- Inspection checklists.

15.2 Inspections

A weekly safety and health inspection will be conducted to determine if operations are being performed in accordance with this HASP and OSHA requirements. The inspections will be conducted by the SSO or FPS. Completed forms will be maintained in the project files. Any significant safety and health deficiencies will be corrected before the SSO authorizes work to continue. Any problems encountered will be discussed during the Tailgate Safety Meeting the following day.

The Project Manager or Corporate HASD will conduct a comprehensive monthly work site safety and health inspection. Copies of the inspection report will be provided to the SSO, FSP and Client Representative(s). The inspector has the authority to terminate "imminently dangerous" activity. Immediate corrective action will be required for any safety and health deficiencies identified during these inspections.

FIGURES

APPENDIX A

TASK HAZARD ANALYSIS WORKSHEETS

TASK HAZARD ANALYSIS WORKSHEET

GULFCO MARINE MAINTENANCE SUPERFUND SITE

TASK NO. 1	**TASK DESCRIPTION: Site Visits and Inspections**

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: Gulfco Marine Maintenance Superfund Site
Prepared By: Matt Wickham	Date: 8/11/05
Reviewed By: Eric Pastor	Date: 8/15/05

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
Perform Site Reconnaissance (accessing by foot any area of the site)	Chemical Exposure, Sunburn, Heat Stress, Cold Exposure, Slip/Trip/Fall, Insects, Poisonous Plants, Snakes, Drowning	All of these hazards can be eliminated. Utilize the specific safe work practices listed in the table below.

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous	
Overhead Lines	Hot	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinc	Stingrays	
Dust	Noise	Slip/Trip/Fall	Drowning	
Excavations/Trenche	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Chemical	Intrusive activities will not be conducted during the site visits and inspections, and therefore the potential for chemical exposure is low. The following safe work practices are required in this area. When possible, stay upwind of the AST area. Do not open any tank or container. Contact with the tanks or containers is permitted, but only the outside of the tank or container can be contacted See Section 3.3 of this HASP for more information on specific chemical hazards. Initial entry air monitoring for organic vapors is required (see Section 7.0 of this HASP).
Traffic	Be careful when parking vehicles along Marlin Ave. to avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.

Heat Stress	If ambient air temperatures are above 70°F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70°F, the following general practices will also be followed: Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. Provide shade, if practical. A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; Hot drinks may be provided in some cases; and
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be

	conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Slip/Trip/Fall	The site has uneven topography, bermed areas with abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Minimize traversing areas the bermed areas or areas of significant debris.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Snakes	Snakes (most likely rattlesnakes) are known to occur on the site and are very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.
Drowning	Relatively steep slopes exist at the shoreline of the Intracoastal Waterway. Since the channels are dredged, the water will deepen quickly away from the shore. Be very careful when walking along the shoreline, and always have a partner with you when walking in these areas. Also use these precautions when near the ponds on the north side of Marlin Ave.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	None
Perform Site Reconnaissance (accessing by foot any area of the site)	None

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipment	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

GULFCO MARINE MAINTENANCE SUPERFUND SITE

TASK NO. 2	**TASK DESCRIPTION: Soil Sampling** Soil samples collected using either hand equipment (augers, shovels, spades) or from a drilling rig (split-barrel sampler, shelby

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: Gulfco Marine Maintenance Superfund Site
Prepared By: Matt Wickham	Date: 8/11/05
Reviewed By: Eric Pastor	Date: 8/15/05

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Snakes	
Unload or load field equipment	Lifting	
Set up and ensure proper functioning of drilling rig	Electrical, Overhead Utilities, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	
Decontaminate all equipment that will contact samples, including sample barrels, augers, etc. (before and after sampling)	Chemical Exposure, Contact Injury	
Drilling rig operation	Chemical Exposure, Electrical, Overhead Utilities, Underground Utilities, Dust, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	
Describe and examine core samples and collect samples	Chemical Exposure, Stick/Puncture/Pinch	
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous	
Overhead Utilities	Hot	Inclement Weather	Snakes	
Underground	Low Light	Stick/Puncture/Pinc	Stingrays	
Dust	Noise	Slip/Trip/Fall	Drowning	
Excavations/Trench	Traffic	High Crime Area	Contact Injury	
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those hazards applicable to this task, develop site-specific safe work practices to address the hazard.

<table>
<tr><th colspan="2">SAFE WORK PRACTICES
(include for all Potential Hazards identified in Table 2)</th></tr>
<tr><td>Chemical Exposure</td><td>Wear appropriate PPE and replace when damaged or worn. When possible, stay upwind of the sampling location. Avoid contact with potentially contaminated soil, cuttings, water, etc. See Section 3.3 of this HASP for more information on specific chemical hazards. Use air monitoring instruments as described in Section 7.0 of the HASP.</td></tr>
<tr><td>Electrical</td><td>Drilling rig has electrical components and wiring. Make sure that drilling rig is operating properly and inspect daily. Repair worn components and wiring. Electrical tools are to be used with a ground fault interrupter. A grounding rod must be used with portable generators. Reportedly, all electrical and gas utilities at the site have been cut off, but confirm with site access contact prior to each field mobilization. If utilities are re-connected in the future, a lockout-tagout procedure must be developed prior to initiation of any intrusive work.</td></tr>
<tr><td>Overhead Utilities</td><td>Check for overhead utilities when raising the drilling rig mast. Identify the voltage of the line and use the following clearance rules:

<table>
<tr><th>Nominal System Voltage of Power Line (kV)</th><th>Minimum Required Clearance (ft)</th></tr>
<tr><td>0-50</td><td>10</td></tr>
<tr><td>51-100</td><td>12</td></tr>
<tr><td>101-200</td><td>15</td></tr>
<tr><td>201-300</td><td>20</td></tr>
<tr><td>301-500</td><td>25</td></tr>
<tr><td>501-750</td><td>35</td></tr>
<tr><td>751-1000</td><td>45</td></tr>
</table>
A call to a utility locating service is mandatory prior to any drilling or digging at the</td></tr>
</table>

	site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call.
Underground Utilities	A call to a utility locating service is mandatory prior to any drilling or digging at the site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call. Look for obvious signs of the presence of utilities (fire hydrants, utility boxes, linear features, manholes, etc.). Always pre-probe the location with a steel probe. Drill or dig carefully in the upper ten feet of the surface. In no instance may a drilling location be within five feet of a known underground utility.
Dust	Wear appropriate PPE and replace when damaged or worn. When possible, stay upwind of the sampling location. Use water as a dust suppressant when excessive dust is generated (but don't allow contact with the sampled soil).
Heavy Equipment	Be diligent around heavy equipment, especially mobile equipment. Make sure all personnel are aware before moving equipment. Ensure that backup alarms are present and operable. Keep the workplace tidy. Avoid moving parts and do not remove any machine guarding. Remove snag points. Do not wear loose fitting clothes. When staging equipment, make sure that stacked loads are secure and not creating hazards due to shifting.
Lifting	Use caution when lifting heavy equipment or supplies, and use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible.
Hot Surfaces/Burns	Hot surfaces are present due to friction from drilling operations and possibly from sun. Avoid hot surfaces or wait for the surface to cool before touching or moving. Use cotton gloves if possible.
Noise	Wear ear plugs or muffs. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA). Hearing protection should be worn.
Traffic	Be careful when parking vehicles along Marlin Ave. to avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If

	t u r e s a r e a b c v e 7 0 – F c r v c r k e r s f e e l d i s c o n f c r t d u e t c t e r

	p e r a t u r e , v o r k e r s v i l l b e r o r i t o r e d f o r h e a t s t r e s s . H e a t

	s t r e s s i s t h e t e r m u s e d f o r a l l h e a t - r e l a t e d i l l n e s s e s , i

	r c l u d i r g h e a t e x h a u s t i c r , h e a t c r a r p s a r d h e a t s t r c k e . H

	e a t s t r c k e i s t h e r c s t a c v a r c e d s t a g e c f h e a t s t r e s s a r c

	c a r b e f a t a l . s y m p t o m s o f h e a t s t r e s s a r e : c r a m p i n g ; p a l e

	c r c l a r r y s k i r ; t i r e c r e s s c r v e a k r e s s ; h e a c a c h e s , r a u s e a

	cr di zz ir es s; fa ir ti ri g; hi gh h bo cl y te m pe er at ur es; hi co t, re cl

	c r d r y s k i r ; r a p i d , s t r c r g p u l s e ; c r u r c c r s c i c u s r e s s . T h

	e r c s t i r p c r t a r t f a c t c r i r p r e v e r t i r g h e a t i l l r e s s e s i s a

	c e c u a t e v a t e r i r t a k e . H c v e v e r , t h i r s t i s r c t a r a c e c u a t e

	i r d i c a t o r o f h e a t - r e l a t e d i l l n e s s a n d r e l y i n g o n t h i r s t

	will result in dehydration. Once the body becomes dehydra

	ted, it is more difficult to re-hydrate because the gut d

	c e s r c t a b s c r b v a t e r a s v e l l . W h e r a i r t e r p e r a t u r e s e x c

	e e c 7 0 – F , t h e f c l l c v i r g g e r e r a l p r a c t i c e s v i l l a l s c b e f c l l

	c v e c : a p p r c p r i a t e . S c r e c r i r k s a r e t c c c c r c e r t r a t e c a r

	cl ri e e cl t c b e cl i l u t e cl c r c c ri s u m e cl a l c ri g w i t h w a t e r .

	If symptoms of heat stress are noted for a worker, the

	vu cu rk er vu il lc es au se vu cu rk au ct iv it ie s. in m ec di at el y. Th he vu cu rk er

	will be monitored for heat stress and will not resume work

	i r g u r t i l a l l s y r p t c r s h a v e d i s a p p e a r e d .
Cold Exposure	I f a r b i e r t a i r t e r p

	e r a t u r e s a r e b e l c v 5 0 – F c r v c r k e r s f e e l c i s c c r f c r t c u e t c

	temperature, workers will be monitored for cold exposure.

	Sy m pt co m s co f co co l cl s t r e s s a r e : s h i v e r i n g , n u m b n e s s ; l o v b o

	cl y t e r p e r a t u r e s; c r c v s i r e s s s; a r d v e a k r e s s s. W h e r a i r t e r p

	e r a t u r e s a r e b e l o w 5 0 – F o r i f v o r k e r s f e e l d i s c o m f o r t d u e

	t c t e r p e r a t u r e , c c l c s t r e s s w i l l b e r c r i t c r e c f c r a l l w c r k e

	rs. Th es m co st im pe co rt ap m t fa ac to co r in m th es pe re ve es m t in co m co f co co ll cl

	e x p c s u r e i s t h e v e a r i n g c f a c e c u a t e c l c t h i n g . T h e F i e l c

	Project Supervisor will ensure the all workers wear adequat

	e c l c t h i r g . I r a c c i t i c r , v h e r v c r k i r g i r c c l c t e r p e r a t u r

	es, the following procedures will be observed:
Inclement Weather	C ha a

	r g i r g c r d a r g e r c u s v e a t h e r c c r d i t i c r s w i l l b e c l c s e l y r c r i

	t c r e d . E e f c r e t h e v c r k d a y s t a r t s , c h e c k t h e a r e a v e a t h e

	r f c r e c a s t . E e c a r e f u l v h e r v c r k i r g i r t h e r a i r s i r c e t h e

	v c r k a r e a a r c / c r e c u i p r e r t r a y b e s l i p p e r y a r c p c t e r t i a l

	l y h a z a r d c u s . D e p e r d i r g c r t h e s e v e r i t y c f r a i r , v c r k i r

	t h e r a i n s h a l l b e c o n d u c t e d o n l y w h e n t h e f i e l d s t a f f a r e

	c c r f c r t a b l e a r d t h e r a i r d c e s r c t i r t e r f e r e v i t h t h e v c r

	k a c t i v i t y . N e v e r v c r k v i t h e l e c t r i c a l e q u i p r e r t i r t h e r

	a i r . D c r r a i r g e a r a s r e c e s s a r y i f v c r k i r g i r t h e r a i r .

	All field work will be stopped in the event of lightning i

	r t h e v i c i r i t y a r d / c r h e a v y r a i r f a l l .
Stick/Puncture/Pinch	U s e c a u t i c r w h e r r c v

	i r g a u g e r s c r s a r p l i r g e c u i p r e r t . U s e c a u t i c r v h e r c p e r i

	r g s a r p l e b a r r e l s . A v c i d s h a r p s u r f a c e s c r d r i l l i r g r i g .

	W e a r c o t t o n o r l e a t h e r g l o v e s w h e n p o s s i b l e . U s e c a u t i

	c r v h e r u s i r g s h a r p t c c l s a r d r e v e r p c i r t a s h a r p t c c l t c v

	a r d y c u r s e l f v h e r c u t t i r g .
Slip/Trip/Fall	T h e s i t e h a s u r e v e r t c p c g r a p h y ,

	b e r r e d a r e a s v i t h a b a r d c r e d e d u i p r e r t a r d p i p i r g , r i s c e l

	l a r e c u s d e b r i s , s t a r d i r g v a t e r , e t c . T h e r e a r e r a r y c p p c

	rtunities for slips/trips/falls. Please step carefully a

	t a l l t i r e s . M i r i r i z e t r a v e r s i r g a r e a s t h e b e r r e d a r e a s c

	r a r e a s c f s i g r i f i c a r t d e b r i s . k e e p t h e v c r k p l a c e t i d y a

	r d r e r c v e a l l u r r e c e s s a r y e q u i p r e r t p r c r p t l y .
Insects	W a s p s , b e e s ,

	s p i d e r s , c e r t i p e d e s a r d c t h e r i r s e c t s r a y b e f c u r d c r s i t

	e . I r s e c t r e p e l l e r t i s r e c o r r e r c e d . B i t e s a r d s t i r g s f r

	c r i r s e c t s r a y b e p a i r f u l b u t g e r e r a l l y a r e r c t d a r g e r c u s ,

	unless the individual bitten/stung is severely allergic.

	Please survey the field staff for any potential allergies

	a r d t a k e a p p r o p r i a t e p r e c a u t i o n s f o r t h o s e i n d i v i d u a l s .

	S c r e s p i d e r s s u c h a s t h e B l a c k W i d o w a r d B r o w n F e c l u s e c

	a r i r f l i c t a s e r i o u s b i t e t h a t s h o u l d b e e v a l u a t e d b y a r

	e d i c a l p r o f e s s i o n a l .
Poisonous Plants	P o i s o n o u s p l a n t s s u c h a s p o i s o n i v y o r

	p c i s c r c a k r a y b e p r e s e r t a t t h e s i t e , a s v e l l a s c t h e r p

	l a r t s t h a t c a r b e d a r g e r c u s (c a c t u s , b r i a r s , e t c .) . A v c i

	cl v e g e t a t e cl a r e a s i f p c s s i b l e . L e a r n t c r e c c g n i z e p c i s c n

	i v y a r d a v c i d . I f e x p c s u r e t c p c i s c r c u s p l a r t s c c c u r s ,

	identify the plant and seek a remedy. Most irritations c

	a r b e t r e a t e d w i t h c v e r - t h e - c o u r t e r r e c i c a t i o r s . I f a s e

	v e r e r a s h c r a l l e r g y c c c u r s , s e e k m e d i c a l a t t e n t i o n .
Snakes	S n a k e s

	(most likely rattlesnakes) are known to occur on the sit

e

a
r
d

a
r
e

v
e
r
y

d
a
r
g
e
r
c
u
s
.

A
l
v
a
y
s

v
e
a
r

b
c
c
t
s

t
h
a
t

c
c
v
e
r

t

	h e a r k l e s . S r a k e l e g g i r g s a r e r e c c r r e r d e d v h e r v a l k i r g i

	r v e g e t a t e d a r e a s . C a r r y a s t i c k o r c a r e a r d d i s t u r b t h e

	b r u s h i r f r c r t c f y c u w h e r w a l k i r g i r v e g e t a t e d a r e a s .

	E e a v a r e t h a t a t c e r t a i n t i m e s o f t h e y e a r , s n a k e s m a y b e

	very sluggish and may not move out of your way – they ar

	e s t i l l c a r g e r c u s . E e v e r y c a r e f u l i f r c v i r g c b j e c t s t h a t

	s r a k e s r a y h i d e u r d e r .
Drowning	F e l a t i v e l y s t e e p s l o p e s e x i s t a t t h

	e s h c r e l i r e c f t h e I r t r a c c a s t a l V a t e r v a y . S i r c e t h e c h a r r

	e l s a r e d r e d g e d , t h e w a t e r w i l l d e e p e n q u i c k l y a w a y f r o m t

	h e s h c r e . E e v e r y c a r e f u l v h e r v a l k i n g a l c n g t h e s h c r e l i n

	e , a r c a l v a y s h a v e a p a r t r e r v i t h y c u v h e r v a l k i r g i r t h e

	s e a r e a s . A l s o u s e t h e s e p r e c a u t i o n s w h e n r e a r t h e p o r c s

	c r t h e r c r t h s i d e c f M a r l i r A v e .
Contact Injury	S t

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	Traffic	None identified.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and ensure proper functioning of drilling rig	Electrical, Overhead Utilities, Heavy Equipment, Lifting, Hot Surfaces/Burns,	None identified.

	Stick/Puncture/Pinch, Slip/Trip/Fall	
Decontaminate all equipment that will contact samples, including sample barrels, augers, etc. (before and after sampling)	Chemical Exposure, Contact Injury	None identified.
Drilling rig operation	Electrical, Overhead Utilities, Underground Utilities, Dust, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	Water to control dust (possibly use fans to control major dust or organic vapor problem) Use plastic sheeting when necessary to prevent contamination of ground.
Describe and examine core samples and collect samples	Chemical Exposure, Stick/Puncture/Pinch	None identified.
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	None identified.

POSSIBLE ENGINEERING CONTROLS				
Fans	Lin	Pressurized Cabs	R	
Foam	Hay	Wind Screen	D	
Sedimentation	Wat	Hoses	In	
Blowers	Wat	Covers	P	
Berms	Spri	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

GULFCO MARINE MAINTENANCE SUPERFUND SITE

TASK NO. 3	TASK DESCRIPTION: Groundwater Monitoring Well Installation Monitoring wells installed using an auger or rotary drilling rig. This

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: Gulfco Marine Maintenance Superfund Site
Prepared By: Matt Wickham	Date: 8/11/05
Reviewed By: Eric Pastor	Date: 8/15/05

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart	Traffic	See the safe work practices listed in Table 4.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Snakes	
Unload or load field equipment	Lifting	
Set up and ensure proper functioning of drilling rig	Electrical, Overhead Utilities, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	
Decontaminate all equipment that will contact monitoring well boring, including sample barrels, augers, etc. (before and after sampling)	Chemical Exposure, Contact Injury	
Drilling rig operation	Chemical Exposure, Electrical, Overhead Utilities, Underground Utilities, Dust, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	
Construct monitoring well	Chemical Exposure, Dust, Lifting	
Develop well	Chemical Exposure, Heavy Equipment, Lifting,	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous	
Overhead Utilities	Hot	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinc	Stingrays	
Dust	Noise	Slip/Trip/Fall	Drowning	
Excavations/Trenche	Traffic	High Crime Area	Contact Injury	
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

<table>
<tr><th colspan="2">SAFE WORK PRACTICES
(include for all Potential Hazards identified in Table 2)</th></tr>
<tr><td>Chemical Exposure</td><td>Wear appropriate PPE and replace when damaged or worn. When possible, stay upwind of the drilling location. Avoid contact with potentially contaminated soil, cuttings, water, etc. See Section 3.3 of this HASP for more information on specific chemical hazards. Use air monitoring instruments as described in Section 7.0 of the HASP.</td></tr>
<tr><td>Electrical</td><td>Drilling rig has electrical components and wiring. Make sure that drilling rig is operating properly and inspect daily. Repair worn components and wiring. Electrical tools are to be used with a ground fault interrupter. A grounding rod must be used with portable generators. Reportedly, all electrical and gas utilities at the site have been cut off, but confirm with site access contact prior to each field mobilization. If utilities are re-connected in the future, a lockout-tagout procedure must be developed prior to initiation of any intrusive work.</td></tr>
<tr><td>Overhead Utilities</td><td>Check for overhead utilities when raising the drilling rig mast. Identify the voltage of the line and use the following clearance rules:

<table>
<tr><th>Nominal System Voltage of Power Line (kV)</th><th>Minimum Required Clearance (ft)</th></tr>
<tr><td>0-50</td><td>10</td></tr>
<tr><td>51-100</td><td>12</td></tr>
<tr><td>101-200</td><td>15</td></tr>
<tr><td>201-300</td><td>20</td></tr>
<tr><td>301-500</td><td>25</td></tr>
<tr><td>501-750</td><td>35</td></tr>
<tr><td>751-1000</td><td>45</td></tr>
</table>

A call to a utility locating service is mandatory prior to any drilling or digging at the site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call.</td></tr>
</table>

Underground Utilities	A c a l l t o a u t i l i t y l o c a t i r g s e r v i c e i s r a r d a t o r y p r i o r t o

	a r y d r i l l i r g o r d i g g i r g a t t h e s i t e s , r e g a r d l e s s o f d e p t h .

	C a l l 1 - 8 0 0 - D I G - T E S S o r T e x a s C r e C a l l . L o o k f o r o b v i o u s

	s i g n s o f t h e p r e s e n c e o f u t i l i t i e s (f i r e h y d r a n t s , u t i l i t

	y b c x e s , l i r e a r f e a t u r e s , r a r h c l e s , e t c .) . A l v a y s p r e - p r c

	b e t h e l c c a t i c r w i t h a s t e e l p r c b e . D r i l l c r d i g c a r e f u l l

	y i r t h e u p p e r t e r f e e t o f t h e s u r f a c e . I r r o i r s t a r c e r a

	y a d r i l l i n g l o c a t i o n b e w i t h i n f i v e f e e t o f a k n o w n u n d e r

	gl r c u r d u t i l i t y .
Dust	W e a r a p p r c p r i a t e P P E a r d r e p l a c e w h e r d a r a g

	e cl co r w co r ru . W h e ru p co s s i bl e , s t a y u p w i ru cl co f t h e s a r p l i ng l co

	c a t i c r . U s e v a t e r a s a d u s t s u p p r e s s a r t v h e r e x c e s s i v e d u

	s t i s g e r e r a t e d (b u t d o r ' t a l l o v c o r t a c t v i t h t h e s a r p l e d

	s c i l) . A v c i d c c r t a c t w i t h d u s t f r c r d r i l l i r g r u d a d d i t i v e

	s , f i l t e r p a c k s a r d (s i l i c a) , b e r t c r i t e a r d F c r t l a r d c e r e r

	t.
Heavy Equipment	E e c i l i g e r t a r c u r c h e a v y e q u i p r e r t , e s p e c i a l l y r c b i l e e q

	u i p r e r t . M a k e s u r e a l l p e r s o n n e l a r e a w a r e b e f o r e r e v i r g

	e c u i p r e r t . E r s u r e t h a t b a c k u p a l a r r s a r e p r e s e r t a r d c p e r

	a b l e . K e e p t h e w c r k p l a c e t i d y . A v c i d r c v i r g p a r t s a r d d c

	r c t r e r c v e a r y r a c h i r e g u a r d i r g . R e r c v e s r a g p c i r t s . D c

	r c t w e a r l c c s e f i t t i r g c l c t h e s . W h e r s t a g i r g e q u i p r e r t ,

	r a k e s u r e t h a t s t a c k e d l o a d s a r e s e c u r e a r d r o t c r e a t i r g h

	a z a r d s d u e t c s h i f t i n g .
Lifting	U s e c a u t i o n w h e n l i f t i n g h e a v y e q u i

	p r e r t c r s u p p l i e s , v h e r a d d i r g v e l l r a t e r i a l s t c t h e v e l l

(s
a
r
d
,
b
e
r
t
c
r
i
t
e
)
,
v
h
e
r
l
i
f
t
i
r
g
d
e
v
e
l
c
p
r
e
r
t
p
u
r
p
s
c
r
b
a
i
l
e

	rs , et c. . U se th es pr co pe er lif tin rig te ch ni qu es (us e le gs ar di

	b a c k , r c v e d e l i b e r a t e l y , e t c .) . U s e t e a r l i f t w h e r p c s s i

	b l e . U s e r a c h i r e r y f o r h e a v y l i f t s i f p o s s i b l e .
Hot Surfaces/Burns	H o t s u r f a c

	d possibly from sun. Avoid hot surfaces or wait for the s

	u r f a c e t o c o o l b e f o r e t o u c h i n g o r r o v i n g . U s e c o t t o n g l o v

	es s i f p c s s i b l e .
Noise	W e a r e a r p l u g s c r r u f f s w h e r r e a r c p e r a t i r g

	d r i l l i n g r i g o r p u r p s . I f y o u h a v e t o r a i s e y o u r v o i c e t

	c s p e a k w i t h s c r e c r e w i t h i r 2 f e e t c f y c u r l c c a t i c r , y c u r

	a y b e a p p r c a c h i r g e x c e s s i v e r c i s e l e v e l s (& 5 d E A) .
Traffic	E e c a r e f

	u l v h e r p a r k i r g v e h i c l e s a l c r g M a r l i r A v e . t c a v c i d r u d / v a

	t e r i r t h e d i t c h e s . E e c a r e f u l w h e r e x i t i r g v e h i c l e s a r d

	l c c k f c r c r c c r i r g t r a f f i c . A l v a y s l c c k a l l v a y s b e f c r e s t

	a r t i r g f r c r a s t c p .
Sunburn	C v e r -
Heat Stress	I f a r b i e r t a i r t e r p e r a t u r e s a r e a

b
c
v
e

7
0
–
F

c
r

v
c
r
k
e
r
s

f
e
e
l

d
i
s
c
c
r
f
c
r
t

d
u
e

t
c

t
e
r
p
e
r
a
t
u
r
e
,

v

c
r
k
e
r
s

w
i
l
l

b
e

r
c
r
i
t
c
r
e
d

f
c
r

h
e
a
t

s
t
r
e
s
s
.

H
e
a
t

s
t
r
e
s
s

i
s

	t h e t e r r u s e d f o r a l l h e a t - r e l a t e d i l l n e s s e s , i n c l u d i n g h e

		a t e x h a u s t i o r , h e a t c r a r p s a r d h e a t s t r o k e . H e a t s t r o k e i

s

t
h
e

r
c
s
t

a
d
v
a
r
c
e
d

s
t
a
g
e

o
f

h
e
a
t

s
t
r
e
s
s

a
r
d

c
a
r

b
e

f
a
t
a
l
.

	s y r p t c r s c f h e a t s t r e s s a r e : c r a r p i r g ; p a l e c r c l a r r y s k i

r
;

t
i
r
e
d
r
e
s
s

c
r

w
e
a
k
r
e
s
s
;

h
e
a
d
a
c
h
e
s
,

r
a
u
s
e
a

c
r

d
i
z
z
i
r
e
s
s
;

	f a i r t i r g ; h i g h b c d y t e r p e r a t u r e ; h c t , r e d c r d r y s k i r ; r a p

		id, strong pulse; or unconsciousness. The most important

f
a
c
t
o
r

i
n

p
r
e
v
e
n
t
i
n
g

h
e
a
t

i
l
l
n
e
s
s
e
s

i
s

a
d
e
q
u
a
t
e

w
a
t
e
r

i
n
t
a

k
e
.

H
c
w
e
v
e
r
,

t
h
i
r
s
t

i
s

r
c
t

a
r

a
d
e
c
u
a
t
e

i
r
d
i
c
a
t
c
r

c
f

h
e
a
t
-

	related illness and relying on thirst will result in dehyd

	r a t i c r . C r c e t h e b c d y b e c c r e s d e h y d r a t e d , i t i s r c r e d i f f

a
s

v
e
l
l
.

W
h
e
r

a
i
r

t
e
r
p
e
r
a
t
u
r
e
s

e
x
c
e
e
d

7
0
–
F
,

t
h
e

f
o
l
l
o
w
i
n

		g general practices will also be followed: appropriate.

r

c
c
r
s
u
r
e
d

a
l
c
r
g

w
i
t
h

w
a
t
e
r
.

I
f

s
y
r
p
t
c
r
s

c
f

h
e
a
t

s

t
r
e
s
s

a
r
e

r
c
t
e
d

f
c
r

a

v
c
r
k
e
r
,

t
h
e

v
c
r
k
e
r

v
i
l
l

c
e
a
s
e

v
c
r
k

a

c
t
i
v
i
t
i
e
s

i
r
r
e
c
i
a
t
e
l
y
.

T
h
e

w
o
r
k
e
r

w
i
l
l

b
e

r
e
q
u
i
r
e
d

f
o
r

h

	h a v e d i s a p p e a r e d .
Cold Exposure	I f a r b i e r t a i r t e r p e r a t u r e s a r e b e l o w 5 0 –

F
c
r
v
c
r
k
e
r
s
f
e
e
l
c
i
s
c
c
r
f
c
r
t
c
u
e
t
c
t
e
r
p
e
r
a
t
u
r
e
,
v
c
r
k
e
r
s
v

	i l l b e r c r i t c r e d f c r c c l d e x p c s u r e . s y r p t c r s c f c c l d s t r e

	s s a r e : s h i v e r i n g , n u r b r e s s ; l o v b o d y t e r p e r a t u r e ; d r o v s i n

	c r i f v c r k e r s f e e l c i s c c r f c r t c u e t c t e r p e r a t u r e , c c l c s t r

	es s. wi ll be es re co rd it co re es cl fo r al l wo rk es rs . Th es re co st in re pa co rt au re t

f
a
c
t
o
r

i
n

t
h
e

p
r
e
v
e
n
t
i
o
n

o
f

c
o
l
d

e
x
p
o
s
u
r
e

i
s

t
h
e

w
e
a
r
i
n
g

	c f a c e c u a t e c l c t h i r g . T h e F i e l d P r c j e c t S u p e r v i s c r w i l l e

	r s u r e t h e a l l v c r k e r s v e a r a c e c u a t e c l c t h i r g . I r a c c i t i c r

,

v
h
e
r

v
c
r
k
i
r
g

i
r

c
c
l
d

t
e
r
p
e
r
a
t
u
r
e
s
,

t
h
e

f
c
l
l
c
v
i
r
g

p
r
c
c
e
d
u

	r e s w i l l b e c b s e r v e d : –
Inclement Weather	C h a r g i r g c r d a r g e r c u s w e a t h e r

	c c r d i t i c r s w i l l b e c l c s e l y r c r i t c r e d . E e f c r e t h e w c r k d a

	y s t a r t s , c h e c k t h e a r e a v e a t h e r f o r e c a s t . E e c a r e f u l v h e

	r v c r k i r g i r t h e r a i r s i r c e t h e v c r k a r e a a r d / c r e q u i p r e r t

	t h e s e v e r i t y o f r a i n , w o r k i n t h e r a i n s h a l l b e c o n d u c t e d

	c r l y w h e r t h e f i e l d s t a f f a r e c o r f o r t a b l e a r d t h e r a i r d o e

	s r c t i r t e r f e r e w i t h t h e w c r k a c t i v i t y . N e v e r w c r k w i t h e

	l e c t r i c a l e q u i p r e r t i r t h e r a i r . D c r r a i r g e a r a s r e c e s s a

	r y i f w c r k i n g i n t h e r a i n . A l l f i e l d w c r k w i l l b e s t c p p e d

	i r t h e e v e r t o f l i g h t r i r g i r t h e v i c i r i t y a r d / o r h e a v y r a

	i r f a l l .
Stick/Puncture/Pinch	U s e c a u t i o n w h e n r o v i n g a u g e r s o r s a n p l i n g e q u i p n e n

	t. Use caution when opening sample barrels. Avoid sharp

	s u r f a c e s c r d r i l l i n g r i g . W e a r c o t t o n c r l e a t h e r g l o v e s w

	h e r p c s s i b l e . U s e c a u t i c r w h e r u s i r g s h a r p t c c l s a r d r e v e

	r p c i r t a s h a r p t c c l t c w a r d y c u r s e l f w h e r c u t t i r g .
Slip/Trip/Fall	T h e s i t e

	h a s u r e v e r t c p c g r a p h y , b e r r e d a r e a s w i t h a b a r d c r e d e q u i p r

	e r t a r d p i p i r g , r i s c e l l a r e c u s d e b r i s , s t a r d i r g v a t e r , e t c .

	T h e r e a r e r a r y c p p c r t u r i t i e s f c r s l i p s / t r i p s / f a l l s . P l e

	a s e s t e p c a r e f u l l y a t a l l t i m e s . M i n i m i z e t r a v e r s i n g a r e a

s

t
h
e

b
e
r
r
e
c

a
r
e
a
s

c
r

a
r
e
a
s

c
f

s
i
g
r
i
f
i
c
a
r
t

c
e
b
r
i
s
.

k
e
e
p

t

	h e v c r k p l a c e t i d y a r d r e r c v e a l l u r r e c e s s a r y e q u i p r e r t p r c

	r p t l y .
Insects	V a s p s , b e e s , s p i d e r s , c e r t i p e d e s a r d o t h e r i r s e c t s r

	a y b e f c u r d c r s i t e . I r s e c t r e p e l l e r t i s r e c c r r e r d e d . B i

	t e s a r d s t i r g s f r c r i r s e c t s r a y b e p a i r f u l b u t g e r e r a l l y a

	r e r c t d a r g e r c u s , u r l e s s t h e i r d i v i d u a l b i t t e r / s t u r g i s s e

	v e r e l y a l l e r g i c . P l e a s e s u r v e y t h e f i e l d s t a f f f o r a r y p o

	t e r t i a l a l l e r g i e s a r d t a k e a p p r o p r i a t e p r e c a u t i o n s f o r t h o

	s e i r d i v i d u a l s . S c r e s p i d e r s s u c h a s t h e E l a c k W i d o w a r d

	E r c v r F e c l u s e c a r i r f l i c t a s e r i c u s b i t e t h a t s h c u l d b e e v

	a l u a t e d b y a r e d i c a l p r o f e s s i o n a l .
Poisonous Plants	P o i s o n o u s p l a n t s s u c h a s

	p c i s c r i v y c r p c i s c r c a k r a y b e p r e s e r t a t t h e s i t e , a s v

	e l l a s c t h e r p l a r t s t h a t c a r b e d a r g e r c u s (c a c t u s , b r i a r s ,

	e t c .) . A v c i d v e g e t a t e d a r e a s i f p o s s i b l e . L e a r r t o r e c o

	gl ru i z e p c i s c ru i v y a ru cl a v c i cl . I f e x p c s u r e t c p c i s c ru c u s p l a ru

	t s c c c u r s , i d e n t i f y t h e p l a n t a n d s e e k a r e n e d y . M o s t i r r

	i t a t i c r s c a r b e t r e a t e d w i t h c v e r - t h e - c c u r t e r r e d i c a t i c r s .

	If a s e v e r e r a s h o r a l l e r g y o c c u r s , s e e k r e d i c a l a t t e n t i

	c r .
Snakes	S r a k e s (r c s t l i k e l y r a t t l e s r a k e s) a r e k r c v r t c c c c u r c r

t
h
e

s
i
t
e

a
r
d

a
r
e

v
e
r
y

d
a
r
g
e
r
c
u
s
.

A
l
w
a
y
s

w
e
a
r

b
o
o
t
s

t
h
a
t

	c c v e r t h e a r k l e s . S r a k e l e g g i r g s a r e r e c o r r e r d e d w h e r w a l

	k i r g i r v e g e t a t e d a r e a s . C a r r y a s t i c k o r c a r e a r d d i s t u r

	b t h e b r u s h i n f r o n t o f y o u w h e n w a l k i n g i n v e g e t a t e d a r e a

	s . E e a v a r e t h a t a t c e r t a i n t i m e s o f t h e y e a r , s u a k e s m a y

	a r e s t i l l d a r g e r c u s . E e v e r y c a r e f u l i f r c v i r g c b j e c t s t h

	a t s r a k e s r a y h i d e u r d e r .
Drowning	F e l a t i v e l y s t e e p s l o p e s e x i s t a t

	t h e s h o r e l i n e o f t h e I n t r a c o a s t a l W a t e r w a y . S i n c e t h e c h a

	r r e l s a r e d r e d g e d , t h e w a t e r w i l l d e e p e n q u i c k l y a w a y f r o m

	t h e s h o r e . E e v e r y c a r e f u l w h e r w a l k i n g a l o n g t h e s h o r e l

	i r e , a r d a l v a y s h a v e a p a r t r e r v i t h y o u v h e r v a l k i r g i r t h

	e s e a r e a s . A l s c u s e t h e s e p r e c a u t i o n s w h e n n e a r t h e p o n d s

	c r t h e r c r t h s i d e c f M a r l i r A v e .
Contact Injury	S t a y c l e a r c f s p r a y f r c r

	s t e a r c l e a r e r d u r i r g d e c o r t a r i r a t i o r o p e r a t i o r s . W e a r P P E

	, i r c l u d i r g g c g g l e s c r f a c e s h i e l d .

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart	Traffic	None identified.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and ensure proper functioning of drilling rig	Electrical, Overhead Utilities, Heavy Equipment, Lifting, Hot Surfaces/Burns,	None identified.
Decontaminate all equipment that will	Chemical Exposure, Contact Injury	None identified.

contact monitoring well boring, including sample barrels, augers, etc. (before and after sampling)		
Drilling rig operation	Chemical Exposure, Electrical, Overhead Utilities, Underground Utilities, Dust, Heavy Equipment, Lifting, Hot Surfaces/Burns, Stick/Puncture/Pinch, Slip/Trip/Fall	Water to control dust (possibly use fans to control major dust problem) Use plastic sheeting when necessary to prevent contamination of ground.
Construct monitoring well	Chemical Exposure, Dust, Lifting	None identified.
Develop well	Chemical Exposure, Heavy Equipment, Lifting, Slip/Trip/Fall	None identified

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote	
Foam	Hay Bal	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water	Covers	Plastic	
Berms	Sprinkle	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

GULFCO MARINE MAINTENANCE SUPERFUND SITE

TASK NO. 4	**TASK DESCRIPTION: Staff Gauge Installation** Staff gauges installed in the Intracoastal Waterway and possibly in the Ponds and Lagoons present on the site.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: Gulfco Marine Maintenance Superfund Site
Prepared By: Matt Wickham	Date: 8/11/05
Reviewed By: Eric Pastor	Date: 8/11/05

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart	Traffic	See the safe work practices listed in Table 4.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Snakes	
Unload or load field equipment	Lifting	
Access water areas	Drowning, Stingrays	
Install staff gauges	Underground Utilities, Noise, Stick/Puncture/Pinch, Stingrays, Drowning	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous	
Overhead Lines	Hot	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinc	Stingrays	
Dust	Noise	Slip/Trip/Fall	Drowning	
Excavations/Trenche	Traffic	High Crime Area		

Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Underground Utilities	Staff gauges may require digging or hammering of the gauge or gauge supports into the ground. A call to a utility locating service is mandatory prior to any drilling or digging at the site, regardless of depth. Call 1-800-DIG-TESS or Texas One Call. Look for obvious signs of the presence of utilities (fire hydrants, utility boxes, linear features, manholes, etc.). Always pre-probe the location with a steel probe. Drill or dig carefully in the upper ten feet of the surface. In no instance may a drilling location be within five feet of a known underground utility.
Lifting	Use caution when lifting heavy equipment or supplies, and when adding well materials to the well (sand, bentonite). Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible.
Noise	Wear ear plugs or muffs. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles along Marlin Ave. to avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70–F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70–F, the following general practices will also be followed: Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte

	replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. Provide shade, if practical. A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50–F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50–F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; Hot drinks may be provided in some cases; and Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when installing staff gauges or the supporting structure. Avoid sharp surfaces. Wear cotton or leather gloves when possible. Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The site has uneven topography, bermed areas with abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Minimize traversing areas the bermed areas or areas of significant debris. Be careful on along the banks of the Intracoastal Waterway and always work in teams of at least two people.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.

Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Snakes	Snakes (most likely rattlesnakes) are known to occur on the site and are very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.
Stingrays	Stingrays may be present in shallow water in the Intracoastal Waterway or in tidally-influenced surface water bodies. Always move noisily and shuffle feet when in these water bodies.
Drowning	Relatively steep slopes exist at the shoreline of the Intracoastal Waterway. Since the channels are dredged, the water will deepen quickly away from the shore. Be very careful when walking along the shoreline, and always have a partner with you when walking in these areas. Also use these precautions when near the ponds on the north side of Marlin Ave.

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart	Traffic	None identified.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Slip/Trip/Fall, Insects, Poisonous Plants, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Access water areas	Drowning, Stingrays	None identified.
Install staff gauges	Underground Utilities, Noise, Stick/Puncture/Pinch, Stingrays, Drowning	None identified.

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Remote Equipm	

			ent	
Foam	Hay Bales	Wind Screen	Dry Ice	
Sedimentation Basin	Water	Hoses	Inert Gas	
Blowers	Water Truck	Covers	Plastic Sheeting	
Berms	Sprinklers	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

GULFCO MARINE MAINTENANCE SUPERFUND SITE

TASK NO. 5	**TASK DESCRIPTION: Groundwater Sampling** Groundwater samples collected using various types of pumps, water-level measurement devices, water quality meters, etc.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: Gulfco Marine Maintenance Superfund Site
Prepared By: Matt Wickham	Date: 8/11/05
Reviewed By: Eric Pastor	Date: 8/11/05

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Snakes	
Unload or load field equipment	Lifting	
Set up and calibrate monitoring instruments	Electrical	
Decontaminate all equipment that will contact groundwater samples, including pumps, tubing, probes (before and after sampling) (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electrical	
Purge well	Chemical Exposure, Electrical	
Collect samples	Chemical Exposure	
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous	
Overhead Lines	Hot	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinc	Stingrays	
Dust	Noise	Slip/Trip/Fall	Drowning	
Excavations/Trenche	Traffic	High Crime Area		
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Chemical Exposure	Wear appropriate PPE and replace when damaged or worn. Avoid contact with potentially contaminated soil, cuttings, water, etc. See Section 3.3 of this HASP for more information on specific chemical hazards. Use air monitoring instruments as described in Section 7.0 of the HASP. Minimize contact with the preservatives used for groundwater samples (especially acids such as nitric or hydrochloric) and wear PPE.
Electrical	Drilling rig has electrical components and wiring. Make sure that drilling rig is operating properly and inspect daily. Repair worn components and wiring. Electrical tools are to be used with a ground fault interrupter. A grounding rod must be used with portable generators. Reportedly, all electrical and gas utilities at the site have been cut off, but confirm with site access contact prior to each field mobilization. If utilities are re-connected in the future, a lockout-tagout procedure must be developed prior to initiation of any intrusive work.
Lifting	Use caution when lifting heavy equipment or supplies, when lifting pumps or bailers, etc.. Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible. Use machinery for heavy lifts if possible.
Noise	Wear ear plugs or muffs when near operating pumps. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles along Marlin Ave. to avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop.

Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70–F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70–F, the following general practices will also be followed: Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. Provide shade, if practical. A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50–F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50–F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed:

	Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; Hot drinks may be provided in some cases; and Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The site has uneven topography, bermed areas with abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Minimize traversing areas the bermed areas or areas of significant debris. Keep the work area tidy.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Snakes	Snakes (most likely rattlesnakes) are known to occur on the site and are very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	Traffic	None identified.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.

Set up and calibrate monitoring instruments	Electrical	None identified.
Decontaminate all equipment that will contact groundwater samples, including pumps, tubing, probes (before and after sampling) (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	Use plastic sheeting when necessary to prevent contamination of ground.
Purge well	Chemical Exposure, Electrical	Use plastic sheeting when necessary to prevent contamination of ground.
Collect samples	Chemical Exposure	Use plastic sheeting when necessary to prevent contamination of ground.
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Re	
Foam	Hay Bal	Wind Screen	Dry	
Sedimentation Basin	Water	Hoses	Ine	
Blowers	Water	Covers	Pla	
Berms	Sprinkle	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

GULFCO MARINE MAINTENANCE SUPERFUND SITE

TASK NO. 6	**TASK DESCRIPTION: Surface Water Sampling** Surface water samples collected from wetlands and ponds. Samples may be collected by boat.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: Gulfco Marine Maintenance Superfund Site
Prepared By: Matt Wickham	Date: 8/11/05
Reviewed By: Eric Pastor	Date: 8/11/05

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS	MEASURES TO ELIMINATE

	(Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Poisonous Plants, Snakes	
Unload or load field equipment	Lifting	
Set up and calibrate monitoring instruments	Electrical	
Decontaminate all equipment (before and after sampling) that will contact samples, including pumps, tubing, automated samplers, probes (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	
Access location	Chemical Exposure, Electrical, Stingrays, Drowning, Boat Hazards	
Collect samples	Chemical Exposure	
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous Plants	
Electrical	Lifting	Cold Exposure	Dangerous	
Overhead Lines	Hot Surfaces/Burns	Inclement Weather	Snakes	
Underground Utilities	Low Light	Stick/Puncture/Pinch	Stingrays	
Dust	Noise	Slip/Trip/Fall	Drowning	
Excavations/Trenche	Traffic	High Crime Area	Boat Hazards	

Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Chemical Exposure	Wear appropriate PPE and replace when damaged or worn. Avoid contact with potentially contaminated sediment, water, etc. See Section 3.3 of this HASP for more information on specific chemical hazards. Use air monitoring instruments as described in Section 7.0 of the HASP. Minimize contact with the preservatives used for samples (especially acids such as nitric or hydrochloric) and wear PPE.
Electrical	Drilling rig has electrical components and wiring. Make sure that drilling rig is operating properly and inspect daily. Repair worn components and wiring. Electrical tools are to be used with a ground fault interrupter. A grounding rod must be used with portable generators. Reportedly, all electrical and gas utilities at the site have been cut off, but confirm with site access contact prior to each field mobilization. If utilities are re-connected in the future, a lockout-tagout procedure must be developed prior to initiation of any intrusive work.
Lifting	Use caution when lifting heavy equipment or supplies, when lifting pumps or bailers, etc.. Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible. Use machinery for heavy lifts if possible.
Noise	Wear ear plugs or muffs when near operating pumps. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles along Marlin Ave. to avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop. Use parking brake when unloading boat at boat ramp.
Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70–F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70–F, the following general practices will also be followed: Fluids will be provided to all site workers. Adequate water intake throughout the

	day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. Provide shade, if practical. A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50°F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50°F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture; Hot drinks may be provided in some cases; and Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when using the winch to launch the boat and keep fingers clear. Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The site has uneven topography, bermed areas with abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Minimize traversing areas the bermed areas or areas of significant debris. Keep boat platform and deck clear to eliminate slip/trip/fall hazards.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black

	Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Snakes	Snakes (most likely rattlesnakes) are known to occur on the site and are very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.
Stingrays	Stingrays may be present in shallow water in the Intracoastal Waterway or in tidally-influenced surface water bodies. Always move noisily and shuffle feet when in these water bodies.
Drowning	Relatively steep slopes exist at the shoreline of the Intracoastal Waterway. Since the channels are dredged, the water will deepen quickly away from the shore. Be very careful when walking along the shoreline, and always have a partner with you when walking in these areas. Also use these precautions when near the ponds on the north side of Marlin Ave.
Boat Hazards	Extreme care shall be used when putting the boat into the water at the boat ramp. Always look for pedestrians or obstructions when backing the boat into the water. In no instance will one person launch a boat; a second person is required. Personal flotation devices must be worn at all times by all personnel on boats. Boat operators will have completed the TPWD Boater Education Course. All personnel not driving the boat shall remain seated at all times, except when assisting with launching, anchoring, etc. Be careful not to get caught in anchor lines. Never place hands near or get body parts near an operating boat propeller. Be aware of wakes from other vessels such as tugboats, barges and other ship traffic in the Intracoastal Waterway. Always yield to larger vessels and sailboats. Be careful when on the sampling platform. Keep equipment stored and work area tidy. Tie down or store all equipment

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	Traffic	None identified.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Poisonous Plants, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and calibrate monitoring instruments	Electrical	None identified.

Decontaminate all equipment (before and after sampling) that will contact samples, including pumps, tubing, automated samplers, probes (unless equipment	Chemical Exposure, Electric	Use plastic sheeting when necessary to prevent contamination of ground.
Access location	Chemical Exposure, Electrical, Stingrays, Drowning, Boat Hazards	None identified.
Collect samples	Chemical Exposure	Use plastic sheeting when necessary to prevent contamination of boat surfaces.
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Re	
Foam	Hay Bal	Wind Screen	Dry	
Sedimentation Basin	Water	Hoses	Ine	
Blowers	Water	Covers	Pla	
Berms	Sprinkle	Sediment Fence		

TASK HAZARD ANALYSIS WORKSHEET

GULFCO MARINE MAINTENANCE SUPERFUND SITE

TASK NO. 7	**TASK DESCRIPTION: Marine Sampling** Sediment samples collected from the ponds, wetlands and the Intracoastal Waterway. Biota samples collected from the Intracoastal Waterway. Samples may be collected by boat.

TABLE 1. GENERAL INFORMATION

PBW Project Number: 1278	Project Name: Gulfco Marine Maintenance Superfund Site
Prepared By: Matt Wickham	Date: 8/11/05
Reviewed By: Eric Pastor	Date: 8/11/05

TABLE 2. TASK HAZARD ANALYSIS

List the task steps in the order that they will occur, assess the potential hazards, and consider the measures to address the hazard. Use Tables 3 and 4 for more detail.

TASK STEPS	POTENTIAL HAZARDS (Choose all potential hazards from Table 3 and list here – add any that are not in Table 3)	MEASURES TO ELIMINATE HAZARD
Arrive/Depart Site	Traffic	See the safe work practices listed in Table 4.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Poisonous Plants, Snakes	
Unload or load field equipment	Lifting	
Set up and calibrate monitoring instruments	Electrical	
Decontaminate all equipment (before and after sampling) that will contact samples, including pumps, tubing, automated samplers, probes (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	
Access location	Chemical Exposure, Electrical, Stingrays, Drowning, Boat Hazards	
Collect samples	Chemical Exposure	
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

TABLE 3. LIST OF POTENTIAL HAZARDS

Highlight the hazards that apply to the task, as identified in Column 2 of Table 2.

POTENTIAL HAZARDS				
Chemical Exposure	Welding/Cutting	Heat Stress	Poisonous	
Electrical	Lifting	Cold Exposure	Dangerous Animals	
Overhead Lines	Hot	Inclement Weather	Snakes	
Underground	Low Light	Stick/Puncture/Pinch	Stingrays	
Dust	Noise	Slip/Trip/Fall	Drowning	
Excavations/Trench	Traffic	High Crime Area	Boat Hazards	
Heavy Equipment	Sunburn	Insects		

TABLE 4. SAFE WORK PRACTICES FOR IDENTIFIED POTENTIAL HAZARDS

Of those applicable hazards listed in Table 3, develop site-specific safe work practices to address the hazard.

SAFE WORK PRACTICES (include for all Potential Hazards identified in Table 2)	
Chemical Exposure	Wear appropriate PPE and replace when damaged or worn. Avoid contact with potentially contaminated sediment, water, etc. See Section 3.3 of this HASP for more information on specific chemical hazards.
Electrical	Drilling rig has electrical components and wiring. Make sure that drilling rig is operating properly and inspect daily. Repair worn components and wiring. Electrical tools are to be used with a ground fault interrupter. A grounding rod must be used with portable generators. Reportedly, all electrical and gas utilities at the site have been cut off, but confirm with site access contact prior to each field mobilization. If utilities are re-connected in the future, a lockout-tagout procedure must be developed prior to initiation of any intrusive work.
Lifting	Use caution when lifting heavy equipment or supplies, when lifting piston corer or Eckman sampler. Use the proper lifting techniques (use legs and back, move deliberately, etc.). Use team lift when possible. Use machinery for heavy lifts if possible. Be careful lifting sample coolers from the boat.
Noise	Wear ear plugs or muffs when near loud equipment. If you have to raise your voice to speak with someone within 2 feet of your location, you may be approaching excessive noise levels (85 dBA).
Traffic	Be careful when parking vehicles along Marlin Ave. to avoid mud/water in the ditches. Be careful when exiting vehicles and look for oncoming traffic. Always look all ways before starting from a stop. Use parking brake when unloading boat at boat ramp.

Sunburn	Over-exposure to the sun can cause sunburn, even on overcast days. Sunburn can happen within 15 minutes, depending on the person. Personnel are encouraged to bring sunscreen with an SPF of least 30 while working outdoors and to apply it several times a day. Personnel are also encouraged to wear long-sleeve shirts, hats and bandannas to cover potentially exposed skin.
Heat Stress	If ambient air temperatures are above 70–F or workers feel discomfort due to temperature, workers will be monitored for heat stress. Heat stress is the term used for all heat-related illnesses, including heat exhaustion, heat cramps and heat stroke. Heat stroke is the most advanced stage of heat stress and can be fatal. Symptoms of heat stress are: cramping; pale or clammy skin; tiredness or weakness; headaches, nausea or dizziness; fainting; high body temperature; hot, red or dry skin; rapid, strong pulse; or unconsciousness. The most important factor in preventing heat illnesses is adequate water intake. However, thirst is not an adequate indicator of heat-related illness and relying on thirst will result in dehydration. Once the body becomes dehydrated, it is more difficult to re-hydrate because the gut does not absorb water as well. When air temperatures exceed 70–F, the following general practices will also be followed: Fluids will be provided to all site workers. Adequate water intake throughout the day is necessary. Workers should drink at least five to seven ounces of cool water every 15-20 minutes. Instruct workers to drink more water than their thirst indicates. Under conditions of profuse sweating, a commercial electrolyte replacement drink may be appropriate. Some drinks are too concentrated and need to be diluted or consumed along with water. Activities which will require the use of protective clothing or respiratory protection will be performed in the early morning or late afternoon, when practical. In hot weather, the number of workers required to wear protective clothing will be minimized, as practical. Provide shade, if practical. A work/rest schedule including rotation of workers required to wear Level C PPE or greater will be developed. If symptoms of heat stress are noted for a worker, the worker will cease work activities immediately. The worker will be monitored for heat stress and will not resume working until all symptoms have disappeared.
Cold Exposure	If ambient air temperatures are below 50–F or workers feel discomfort due to temperature, workers will be monitored for cold exposure. Symptoms of cold stress are: shivering, numbness; low body temperature; drowsiness; and weakness. When air temperatures are below 50–F or if workers feel discomfort due to temperature, cold stress will be monitored for all workers. The most important factor in the prevention of cold exposure is the wearing of adequate clothing. The Field Project Supervisor will ensure the all workers wear adequate clothing. In addition, when working in cold temperatures, the following procedures will be observed: Frequent breaks or rest periods will be provided and workers will have a shelter from wind and moisture;

	Hot drinks may be provided in some cases; and Opportunities to change wet clothing or to don additional clothing will be provided.
Inclement Weather	Changing or dangerous weather conditions will be closely monitored. Before the work day starts, check the area weather forecast. Be careful when working in the rain since the work area and/or equipment may be slippery and potentially hazardous. Depending on the severity of rain, work in the rain shall be conducted only when the field staff are comfortable and the rain does not interfere with the work activity. Never work with electrical equipment in the rain. Don rain gear as necessary if working in the rain. All field work will be stopped in the event of lightning in the vicinity and/or heavy rainfall.
Stick/Puncture/Pinch	Use caution when using the winch to launch the boat and keep fingers clear. Use caution when using sharp tools and never point a sharp tool toward yourself when cutting.
Slip/Trip/Fall	The site has uneven topography, bermed areas with abandoned equipment and piping, miscellaneous debris, standing water, etc. There are many opportunities for slips/trips/falls. Please step carefully at all times. Minimize traversing areas the bermed areas or areas of significant debris.
Insects	Wasps, bees, spiders, centipedes and other insects may be found on site. Insect repellent is recommended. Bites and stings from insects may be painful but generally are not dangerous, unless the individual bitten/stung is severely allergic. Please survey the field staff for any potential allergies and take appropriate precautions for those individuals. Some spiders such as the Black Widow and Brown Recluse can inflict a serious bite that should be evaluated by a medical professional.
Poisonous Plants	Poisonous plants such as poison ivy or poison oak may be present at the site, as well as other plants that can be dangerous (cactus, briars, etc.). Avoid vegetated areas if possible. Learn to recognize poison ivy and avoid. If exposure to poisonous plants occurs, identify the plant and seek a remedy. Most irritations can be treated with over-the-counter medications. If a severe rash or allergy occurs, seek medical attention.
Snakes	Snakes (most likely rattlesnakes) are known to occur on the site and are very dangerous. Always wear boots that cover the ankles. Snake leggings are recommended when walking in vegetated areas. Carry a stick or cane and disturb the brush in front of you when walking in vegetated areas. Be aware that at certain times of the year, snakes may be very sluggish and may not move out of your way – they are still dangerous. Be very careful if moving objects that snakes may hide under.
Stingrays	Stingrays may be present in shallow water in the Intracoastal Waterway or in tidally-influenced surface water bodies. Always move noisily and shuffle feet when in these water bodies.
Drowning	Relatively steep slopes exist at the shoreline of the Intracoastal Waterway. Since the channels are dredged, the water will deepen quickly away from the shore. Be very careful when walking along the shoreline, and always have a partner with you when walking in these areas. Also use these precautions when near the ponds on the north side of Marlin Ave.

Boat Hazards	Extreme care shall be used when putting the boat into the water at the boat ramp. Always look for pedestrians or obstructions when backing the boat into the water. In no instance will one person launch a boat; a second person is required. Personal flotation devices must be worn at all times by all personnel on boats. Boat operators will have completed the TPWD Boater Education Course. All personnel not driving the boat shall remain seated at all times, except when assisting with launching, anchoring, etc. Be careful not to get caught in anchor lines. Never place hands near or get body parts near an operating boat propeller. Be aware of wakes from other vessels such as tugboats, barges and other ship traffic in the Intracoastal Waterway. Always yield to larger vessels and sailboats. Be careful when on the sampling platform. Keep equipment stored and work area tidy. Tie down or store all equipment

TABLE 5. ENGINEERING CONTROLS

Describe any engineering controls that will be used to address the hazards for each task. Pick from list at end of table or add others as necessary.

TASK STEPS	POTENTIAL HAZARDS	ENGINEERING CONTROLS TO BE USED
Arrive/Depart Site	Traffic	None identified.
General	Sunburn, Heat Stress, Cold Exposure, Inclement Weather, Insects, Poisonous Plants, Snakes	None identified.
Unload or load field equipment	Lifting	None identified.
Set up and calibrate monitoring instruments	Electrical	None identified.
Decontaminate all equipment (before and after sampling) that will contact samples, including pumps, tubing, automated samplers, probes (unless equipment is pre-cleaned). Does not consider steam cleaning.	Chemical Exposure, Electric	Use plastic sheeting when necessary to prevent contamination of ground.
Access location	Chemical Exposure, Electrical, Stingrays, Drowning, Boat Hazards	None identified.
Collect samples	Chemical Exposure	Use plastic sheeting when necessary to prevent contamination of boat surfaces.
Pack samples for shipment	Lifting, Stick/Puncture/Pinch	

POSSIBLE ENGINEERING CONTROLS				
Fans	Liners	Pressurized Cabs	Re	

Foam	Hay Bal	Wind Screen	Dry	
Sedimentation Basin	Water	Hoses	Ine	
Blowers	Water	Covers	Pla	
Berms	Sprinkle	Sediment Fence		

APPENDIX B

FORMS

PRE-JOB SAFETY MEETING FORM

GULFCO MARINE MAINTENANCE SUPERFUND SITE

GENERAL INFORMATION

Project Name: Gulfco Marine Maintenance Superfund Site		
PBW Project Number:	Date:	Time:
Presented By:	Signature:	

INFORMATION REVIEWED

Check all items that were reviewed.

	ITEM	DISCUSSION SUMMARY
	Project Background	Work to be performed, safety objectives, site description and conditions
	Project Organization	Safety organization and contacts, client contacts
	Hazard Analysis	Physical/ chemical hazards, measures to address hazards, engineering controls
	Personnel Training	Training requirements (use as an opportunity to verify all training)
	Personal Protective Equipment	Required PPE levels for all work tasks
	Medical Surveillance	Discuss general and site-specific medical surveillance requirements
	Exposure Monitoring	Describe any exposure monitoring to be conducted, actions levels, etc.
	Site Controls	Describe work zones, security issues
	Decontamination Procedures	Describe decontamination areas and procedures for personnel and equipment
	Investigation-Derived Waste	Describe methods and areas to be used for IDW storage
	Emergency Response Plan	Describe emergency procedures, emergency numbers, location of hospital
	Other	Confined space procedures, fall protection, spill containment, if applicable

Discussion/Comments/Follow-up Actions:

ATTENDEES

All meeting attendees must sign below.

NAME	SIGNATURE	COMPANY

TAILGATE SAFETY MEETING FORM

GULFCO MARINE MAINTENANCE SUPERFUND SITE

GENERAL INFORMATION

Project Name: Gulfco Marine Maintenance Superfund Site		
PBW Project Number:	Date:	Time:
Presented By:	Signature:	

TOPICS REVIEWED

Check all items that were reviewed.

	Safety objectives		Safety responsibilities		Work activities for the day
	Newly-recognized hazards		Noise hazards		Decontamination procedures
	Hazard recognition		Air monitoring		Emergency protocol
	Right-To-Know/MSDS location		Slips, trips, and falls		No horseplay
	Open pits, excavations, trenches		Directions to hospital/first aid		Housekeeping
	Vehicle safety and road conditions		Anticipated visitors		Heat stress, cold exposure
	Portable tool safety and awareness		Site security		Backing up hazards
	Overhead utilities		Housekeeping		Dust and vapor control
	Underground utilities		Smoking restrictions		Fire extinguisher locations
	First aid and safety supply location				

Discussion/Comments/Follow-up Actions:

ATTENDEES

All meeting attendees must sign below.

NAME	SIGNATURE	COMPANY

SAFETY COMPLIANCE AGREEMENT FORM

GULFCO MARINE MAINTENANCE SUPERFUND SITE

GENERAL INFORMATION

Project Name: Gulfco Marine Maintenance Superfund Site		
PBW Project Number:	Date:	Time:

SAFETY COMPLIANCE AGREEMENT

I have received a copy of the Site-Specific Health and Safety Plan (the "HASP") for the above referenced project. I have read the HASP and agree to comply with all the health and safety requirements contained therein. I understand that I may be prohibited from working on the project for violating any of the HASP requirements. My signature below indicates that I understand the procedures and restrictions of this plan and agree to abide by them.

If I am a subcontractor, I understand that the HASP provides site-specific safety requirements. It is not intended to replace any general or specific requirements of a subcontractor's safety program. PBW personnel will, to the best of their ability, inform contractors of any potential hazard(s) that has been identified during the field investigations. However, subcontractors will bear the ultimate responsibility for all matters dealing with health and safety in the performance of their appointed work.

PRINT NAME:_____
COMPANY:_____

SIGNATURE:_____
DATE:_____

APPENDIX C

DIRECTIONS TO NEAREST HOSPITAL

APPENDIX D

RESERVED
FOR PLAN ADDENDA